36779

FOCUSED REMEDIAL INVESTIGATION ASBESTOS DUMP SITES WHITE BRIDGE ROAD SITE MORRIS COUNTY, NEW JERSEY

FINAL REPORT

Prepared for:

U.S. Environmental Protection Agency

Contract No.: 68-W9-0003

Work Assignment No.: C02077

TES 6

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WHITE BRIDGE ROAD SITE
MEYERSVILLE, NJ
FOCUSED REMEDIAL INVESTIGATION REPORT

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Emergency and Remedial Response Division
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New York, New York 10278

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NOTE: This Focused Remedial Investigation (Focused RI) report is a compilation of all previously conducted investigations into the nature and extent of contamination at the White Bridge Road property. The scope of this RI report includes data collection on the physical characteristics of the site and surrounding areas, the nature and extent of contaminant sources, and the nature and extent of contamination. The RI has been focused by addressing the contamination with asbestos containing materials as its principal objective. Contaminant fate and transport, and a baseline risk assessment were not included in the scope of this Focused RI. However, a baseline risk assessment has been performed by EPA and will be available in the administrative record for the site, as a separate document.

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1.0 INTRODUCTION

1.1 Purpose of Report

The purpose of this report is to compile all existing data that has been generated during previous investigations and to delineate the nature and extent of contamination at the White Bridge Road Site. As instructed by the EPA, the main objective of this Focused Remedial Investigation effort is to characterize the locations and occurrence of asbestos contamination at the site. This Focused Remedial Investigation also presents additional data originally reported in the National Gypsum Corporation (National Gypsum) 1987 RI Report.

1.2 Background

The asbestos dump site is a National Priority List Site in the EPA National Superfund Program. The asbestos dump site includes four separate properties all of which are located next to or close by the former National Gypsum Plant in southeastern Morris County, New Jersey. These four properties include the Millington Site (where the former National Gypsum Plant was located), the Dietzman Tract, the New Vernon Road Site and the White Bridge Road Site. These latter three sites are collectively referred to as the satellite sites. These three sites are not related except for the fact that at one time they all received asbestos containing materials from the National Gypsum Plant. Currently, the Asbestos Dump Site is divided into three operable units. A record of decision (ROD) for the first operable unit, the Millington Site, was signed on September 30, 1988. Negotiations for implementation of the remedial action were unsuccessful and EPA issued a unilateral order to the potentially responsible party (PRP), National Gypsum. National Gypsum is currently conducting a remedial design for this site. The properties of the second operable unit, the New Vernon Road and White Bridge Road Sites are the subject of these Focused Remedial Investigation efforts. The White Bridge Road Site is discussed in this Focused Remedial Investigation. The remaining third operable unit includes the Dietzman Tract, which will not be discussed under this Work Assignment.

1.2.1 Site Description

The White Bridge Road property consists of approximately 12 acres of land at 651 White Bridge Road in Meyersville, New Jersey. One residence exists onsite. The Site is bounded by White Bridge Road to the north, the Great Swamp National Wildlife Refuge to the east and southeast, Black Brook to the southwest, and a vacant wooded lot to the west (see Figure 1-1). Five private residences are located approximately 700 feet north and west of the property.

An asphalt paved roadway located on the northwest portion of the property maintains access to a two-story dwelling, garage, two sheds, and three stables. A pond, approximately 100 feet in diameter, is located east of these structures. A horse riding track is situated in the east-

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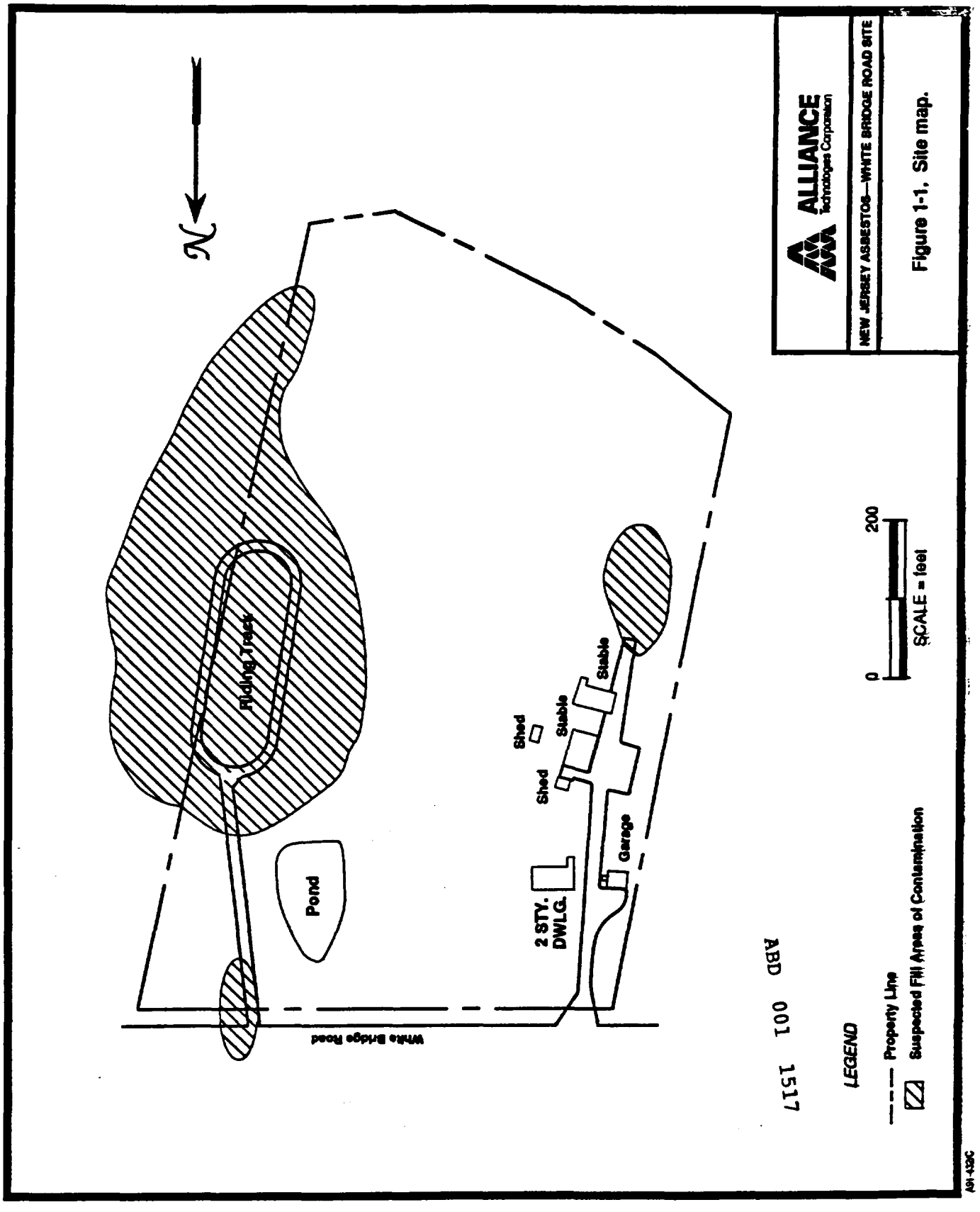
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NEW JERSEY ASBESTOS—WHITE BRIDGE ROAD SITE
Figure 1-1. Site map.
N
Riding Track
Pond
Shed
Shed
Stable
Stable
2 STY. DWLG.
Garage
White Bridge Road
0
200
SCALE = feet
LEGEND
Property Line
Suspected Fill Areas of Contamination
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central portion of the property. This track is approximately 250 feet in length by approximately 125 feet wide and is situated approximately 350 feet from the house and horse stables. A large grazing field is located west of the horseriding track within the central portion of the property. This field is divided into four sections by post and rail fencing and is approximately bounded by the horse riding track, wetlands, the dwelling, and the driveway. Trees line the property along White Bridge Road.

1.2.2 Chronology of Events

From 1945 to 1969, the property was used for farming. From 1970 to 1975, refuse consisting of asbestos tiles and siding from National Gypsum was disposed on the property. Following the termination of landfilling, the current owner converted the property into a horse farm with stables, a horseriding track constructed of asbestos tiles, and grazing fields.

1.2.2.1 Previous Investigations

During 1987, National Gypsum completed a Remedial Investigation (RI) of the asbestos dump sites, Morris County, New Jersey. Results of this RI are included in a RI Report which was prepared by Fred C. Hart Associates, Inc., (Draft Report dated May 29, 1987). As discussed in Section 1.2 of this report, this RI Report focused on four distinct asbestos disposal sites, one of which was the White Bridge Road Site. This RI Report can be accessed by the public at a repository at Passaic Township Hall, 1802 Long Hill Road, Millington, New Jersey.

As stated in the National Gypsum RI Report, the purpose of their investigation was to define the presence and extent of asbestos and other contaminants of concern, if any, at the sites and to evaluate potential impacts of these contaminants to public health and the environment. The RI included a hydrogeological investigation which involved the sampling and subsequent laboratory analysis of subsurface soil, sediments, surface water, ground water, potable water and air. A limited number of samples from these different environmental media were analyzed for asbestos, volatile organics, base neutrals, phenols, pesticides/PCBs, metals and cyanide. The RI was complete for Millington, but did not adequately characterize White Bridge Road, New Vernon Road and Dietzman Tract properties. Results from this investigation for the White Bridge Road Site are presented in Section 2.0 of this report.

In August 1990, the Removal and Action Branch (RAB) collected three soil samples from the White Bridge Road Site. Transmission electron microscopy (TEM) analysis of the samples showed chrysotile asbestos present at concentrations ranging from 2 to 5 percent. After reviewing the data, the Agency for Toxic Substance and Disease Registry (ATSDR) determined the site posed an immediate and substantial health threat to the residents and recommended temporarily relocation of the residents on the site until the threat could be remediated. The residents at the site were not receptive to relocating.

From September to November 1990, removal actions were conducted at the site. Additional work during this investigative effort included the following: (1) signs and a temporary fence

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were erected to restrict access into areas suspected to contain high levels of surficial contamination; (2) the riding track area and dirt road which contained asbestos fragments were covered with geotextile fabric to restrict access and to reduce the potential for airborne releases; and (3) the residence on site was decontaminated by EPA by vacuuming and wet wiping. Air samples were collected and analyzed to verify clean-up levels.

In (3) above, the air sampling was a result of consultation between EPA Region II, ATSDR and the Emergency Response Team (ERT). Sampling was performed on October 16, 1990 and again on October 23 after the decontamination process had been completed. Samples were collected at a flow rate of approximately 12 liters per minute for a 14 hour period (10,000 liters were collected). Analysis of the samples were performed utilizing TEM following sampling method NIOSH Method 7402. All samples, after the residence was decontaminated by vacuuming and wet wiping, contained asbestos concentrations below the method detection limit of 1.0 percent (by weight).

During October and November 1990, Alliance conducted a sampling and analysis program for EPA which consisted of several tasks including: a site survey, a geophysical investigation (*i.e.*, ground penetrating radar [GPR]), soil and air sampling and subsequent analyses of samples for asbestos. Results of this investigation are summarized in Section 2.0 of this report. A detailed report of this field sampling is included in Alliance's Final Field Sampling and Analysis Report, NJ Asbestos Dump Site, White Bridge Road, Meyersville, New Jersey (Alliance, May 1991).

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2.0 NATURE AND EXTENT OF CONTAMINATION

The purpose of this section is to present information on the occurrence and distribution of chemical constituents found at the White Bridge Road property. Data for this section were obtained from the following documents:

- *Final Field Sampling and Analysis Report, NJ Asbestos Dump Site, White Bridge Road, Meyersville, New Jersey.* Prepared by Alliance Technologies Corporation, May 1991.

- *Draft Remedial Investigation Report, Asbestos Disposal Sites, Morris County, New Jersey.* Prepared by Fred C. Hart Associates, Inc., for National Gypsum Corporation, May 1987.

This section is divided into two subsections. The nature and extent of all non-asbestos constituents are discussed in Section 2.1. The occurrence and distribution of asbestos is discussed in Section 2.2.

The White Bridge Road property is located within the north-central area of the Pediment Physiographic Province. This province is made up of the Newark Supergroup Deposits of the Newark Basin, which is one of many Newark Supergroup Basins that parallel the appalachians along the east coast of North America. Geologic information about the site was obtained from the National Gypsum RI Report. Information was obtained from three test borings and was collected only within the northern asbestos landfilled sector of the site. Test boring information revealed the presence of three major naturally-occurring unconsolidated sedimentary deposits of various composition and thickness at various depths underlying the asbestos fill deposit.

The asbestos deposit is comprised of a upper deposit layer consisting mostly of broken asbestos tiles and a lower layer consisting of loose white asbestos fibers. Thicknesses and exact locations of these asbestos fill materials is discussed in Section 2.2 of this report. Underlying the asbestos fill material is a layer of organic rich material. This material consists of a black to brown-colored silty and extremely fibrous peat-like material. This deposit does not exist under all areas that were investigated. Beneath the organic-rich deposit lies a deposit of poorly-sorted silty sand. This silty sand deposit was found in all three test borings and ranged in thickness form 5.5 to 9.5 feet. A clay unit exists under this silty sand under the northern section of the site.

The site lies within the central basin region of the Passaic River drainage basin. Ground water under the site is relatively shallow, ranging from one to six feet from the surface. Therefore, the vadose zone is generally limited to a shallow layer of the subsurface near the surface. Because this unconfined upper water-bearing unit lies so close to the surface, asbestos fill is generally located in the saturated zone. Since site specific information about the subsurface is limited to three test borings advanced to a depth of 12 to 15 feet during the

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National Gypsum RI, it is not known if the clay confining unit discussed above is continuous throughout the site. Ground water flow direction is believed to be flowing from the northeast to the west at a gradient of 0.016. Therefore, ground water is flowing through the major asbestos fill areas toward the swamp/marsh located behind the property.

Hydraulic conductivity values determined from pump test data obtained during the National Gypsum RI ranged from 0.32 to 0.70 feet per day. The discharge velocity was estimated at 2.80 feet per year and the seepage velocity was determined to range from 9.33 to 18.7 feet per year.

The White Bridge Road Site is bordered by the Great Swamp National Wildlife Refuge to the east and south. Consequently, property that is located along the southern boundary of the site contains standing water. The northern and western sections of the site are topographically higher and are relatively dry. From the analysis presented in the site survey map (see foldout map in the back of this report), it is estimated that the site contains approximately 20 percent wetlands. This wetland area is located in the southern region of the site.

2.1 Non-Asbestos Contamination

Data regarding non-asbestos contamination at the Site were obtained during field investigation activities by Hart for National Gypsum from August 1986 to February 1987.

Field investigation activities included the collection and subsequent analysis of three subsurface soil samples (test borings), three sediment samples, three surface water samples, three ground water samples, three domestic well water samples, and three air samples. The air samples were analyzed for asbestos content only and are discussed in Section 2.2.

2.1.1 Data Quality

All of the samples collected during the National Gypsum RI, except for the air samples, were analyzed for priority pollutants plus 40 parameters. This procedure was used to tentatively identify the 15 highest volatile organic fraction peaks, the ten highest acid extractable organic peaks, and the 15 highest base/neutral organic peaks.

Alliance has noted the following data quality issues that must be considered when the 1987 data is interpreted. These data quality issues were identified in reviewing the National Gypsum RI data quality procedures for consistency with the *EPA Region II CERCLA Quality Assurance Manual, Revision 1* (October 1989). These issues include:

- There is limited discussion regarding data validation in the National Gypsum RI Report. No section in the report specifically states the validation procedures used. Consequently, information regarding data quality is limited. Alliance concludes that analytical data generated during the RI Report was evaluated but

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not validated in accordance with all EPA Region II technical evaluation procedures.

- Pursuant to the *Region II, CERCLA Quality Assurance Manual, Revision 1* (October 1989), rinse blanks should be performed for all analytes of interest and should be collected for each type of equipment used each day a decontamination event is carried out. In the National Gypsum RI Report rinse blanks were collected during the field investigation activities performed at the four asbestos subsites. However, the RI Report does not distinguish which rinse blanks were taken at which asbestos subsites. When discussing the data in the RI Report, all analytical data for all four sites were grouped together. Therefore, it is not clear if rinse blanks were performed at the White Bridge Road Site. In discussions that follow, all analytical data from all rinse blanks which are presented in the National Gypsum RI Report are included in this report although, it is not clear from which asbestos subsite a particular rinse blank was collected.

- Analytical results from rinse, trip, laboratory blanks indicate detectable levels of volatile organics, base neutrals, phenols, and metals. Pursuant to *Contract Laboratory Program Organics Data Review and Preliminary Review, SOP No. HW-6, Revision #7* (March 1990), and *Evaluation of Metals for the Contract Laboratory Program SOP No. HW-2, Revision X* (February 1990), the following procedures should be followed when validating and reporting data if analytes are found in laboratory, trip, or rinse blanks:

  1. Action levels for all common laboratory contaminants (methylene chloride, acetone, toluene, 2-butanone, and phthalates, only) should be set at ten (10) times the highest blank concentration for that analyte.

  2. All other action levels for analytes detected in laboratory, trip or rinse blanks should be set at five (5) times the highest blank concentration for that analyte.

  3. If concentration levels in field samples are above the Contractually Required Quantitation Limits (CRQLs) but below the action levels mentioned above, field samples which would be flagged with a "B" (*i.e.*, analyte was found in the blank as well as the sample) should be flagged with a "U" (*i.e.*, analyte not detected). The analytes flagged with a "U" should be considered non-detectable values and should not be included when discussing the data. In the National Gypsum RI Report, this procedure was not performed.

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4. If contamination levels in field samples are above the action levels mentioned above, contamination levels should be treated as valid concentrations.

There is some suggestion in the National Gypsum RI Report that procedures similar to the "10X and 5X rule" as described above, were used but no data was flagged with a "U" and subsequently screened out. It is important to note that the end result of extensive field contamination during the National Gypsum RI is that action levels for analyses would be significantly higher than the CRQLs. The elevated action levels adversely impact data useability, since many risk-based numerical standards and criteria are below these action levels that would be reported if the"10X and 5X" rules were applied.

In the discussion that follows, analytical data generated from the National Gypsum RI are used even though this data has not been properly validated pursuant to EPA Region II guidelines.

2.1.2 Subsurface Soil (Test Borings)

A total of four subsurface soil samples were analyzed from the White Bridge Road Site, two from Boring WBR1 (Sample Nos. 4 and 5), one from Boring WBR2 (Sample No. 10) and one from Boring WBR3 (Sample No. 18). Sample No. 5 was a duplicate of sample No. 4. Sample Nos. 4 and 5 were taken from a test boring located outside the asbestos fill area boundary and from an upgradient location. For these reasons, sample Nos. 4 and 5 may be considered background samples. Sample Nos. 10 and 18 were located within the asbestos fill area. Specific collection depths of these samples are not included in the National Gypsum RI Report. Table 2-1 presents a summary of priority pollutant data for these samples. This table was taken from the National Gypsum RI Report and indicates from the flags designated as "B" in some of the analytes, that some of the analytes were found in the laboratory blank as well as the sample. Analytical data from this laboratory blank is not presented in the RI Report. In addition, there is no indication that rinse blanks were taken while obtaining subsurface soil samples at the White Bridge Road Site. As discussed in Section 2.1.1, this is not in compliance with EPA Region II sample collection procedures. Test boring/monitoring well locations are presented in Figure 2-1.

Volatile organic compounds found within the soils consist of methylene chloride, trichlorofluoromethane, chloroform, benzene, and toluene. Of the volatile organic compounds detected, methylene chloride (29-59 µg/kg), chloroform (2-10 µg/kg), and toluene (2-8 µg/kg) were present in all test boring samples, in the laboratory blank and, except for toluene, in the trip blank. Trichlorofluoromethane (3 µg/kg) and benzene (8-9 µg/kg) were present in sample Nos. 10 and 18. Benzene was also detected in the laboratory blank.

Detected base neutral extractable compounds consist of naphthalene, diethyl phthalate, di-n-butyl phthalate, and bis-2-ethylhexyl phthalate and ranged in concentration from 3 to 2700 µg/kg. Diethyl phthalate was detected in two test borings and the method blank. In

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TABLE 2-1. SUMMARY OF PRIORITY POLLUTANT DATA
TEST BORING SAMPLES
WHITE BRIDGE ROAD SITE

	Sample Number				
	WBR1		WBR2	WBR3	Trip Blank
	4	5**	10	18	9/24/86
Volatile Organics (ug/kg)					
Methylene Chloride	54B	59B	31B	29B	6B
Trichlorofluoromethane	—	—	3J	3J	—
Chloroform	2JB	2JB	10JB	7JB	2JB
Benzene	—	—	8JB	9JB	—
Toluene	2JB	2JB	8JB	7JB	—
Base Neutrals (ug/kg)					
Naphthalene	—	3J	—	—	
Diethyl phthalate	13JB	12JB	69JB	—	
Di-n-butyl phthalate	—	16S	—	2,700	
Bis-2-ethylhexyl phthalate	31J	—	—	—	
Phenols (mg/kg)	—	—	0.54	1.02	
Metals (mg/kg)					
Antimony	32N	19N	84N	70N	
Arsenic	6.4SN	[1.8]N	[5.0]N	—	
Beryllium	—	—	—	[1.0]N	
Cadmium	—	—	—	2.3N	
Chromium	18N	15N	111N	71N	
Copper	32*N	22*N	43*SN	16*N	
Lead	8.9*N	7.2*N	54*SN	3.2*N	
Mercury	—	—	1.16*	4.2*	
Nickel	32N	22N	271N	162N	
Zinc	57*N	43*N	115*N	107N	

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TABLE 2-1. (CONTINUED)

	Sample Number				
	WBR1		WBR2	WBR3	Trip Blank
	4	5**	10	18	9/24/86
Cyanide (mg/kg)	—	—	0.37	0.39	

-- Indicates compound was analyzed for but not detected.
J Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum lower limit but is greater than zero.
B Analyte was found in method blank as well as in sample.
* Indicates duplicate analysis is not within control limits.
N Indicates spike sample recovery is not within control limits.
S Indicates value determined by Method of Standard Addition.
[] Indicated reported value is greater than or equal to the instrument detection limit but less than the contract - required detection limit.
TB Trip Blank
** Sample 5 is a duplicate of sample 4.
Blank space indicates that the sample was not analyzed for that parameter.

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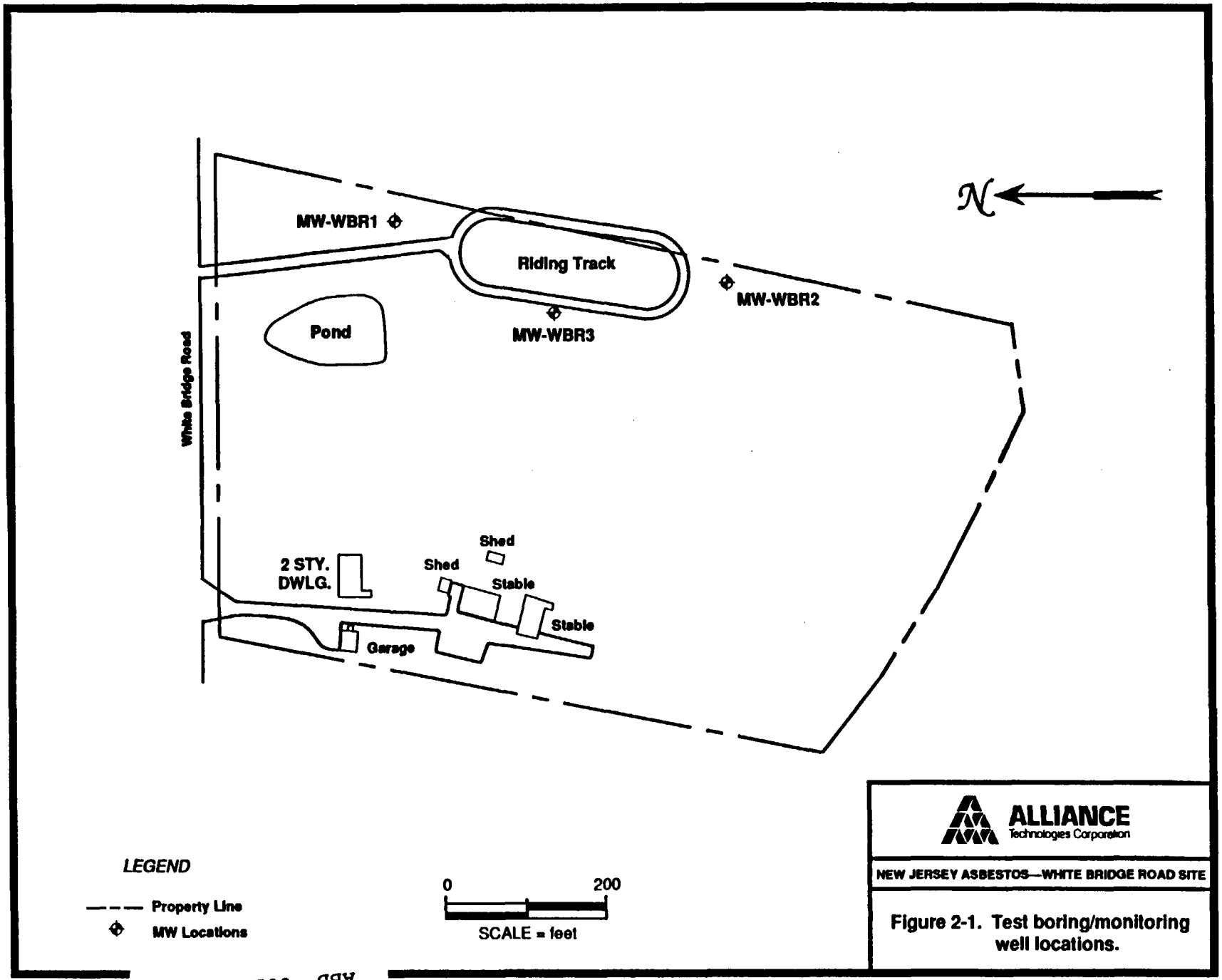

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Boring WBR1, it was present at an estimated value of 12-13 µg/kg and in Boring WBR2, at a estimated concentration of 69 µg/kg. Di-n-butyl phthalate was detected in Boring WBR1 sample No. 5 (16 µg/kg) and Boring WBR3 (2700 µg/kg). Bis-2-ethylhexyl phthalate and naphthalene were detected only in Boring WBR1 at estimated values of 31 and 3 µg/kg, respectively.

Phenols and cyanide were also detected in some of the samples. Phenols were detected at 0.54 mg/kg and 1.02 mg/kg in sample Nos. 10 and 18, respectively. Cyanide was also present in sample Nos. 10 and 18 at concentrations of 0.37 and 0.39 mg/kg, respectively.

Ten metals were detected in the soil samples at concentrations ranging from 1.0 to 271 mg/kg. The total range of concentrations for the metals were antimony (19-84 mg/kg); arsenic (1.8-6.4 mg/kg); beryllium (ND-1.0 mg/kg); cadmium (ND-2.3 mg/kg); chromium (15-111 mg/kg); copper (16-43 mg/kg); lead (3.2-54 mg/kg); mercury (1.16-4.2 mg/kg); nickel (22-271 mg/kg) and zinc (43-115 mg/kg). The above concentrations were compared to common ranges of naturally occurring elements which are found in soils. This data, which is presented in Table 2-2, was obtained from EPA, Solid Waste and Emergency Response, *Hazardous Waste Land Treatment,* SW-874, April 1983. When comparing these concentrations to standard background levels in natural soils, seven elements (arsenic, beryllium, chromium, copper, lead, nickel and zinc) fall within commonly found ranges. Cadmium and mercury in WBR3 and antimony in all three samples were found in concentrations above ranges typically found in natural soils. However, comparing metal concentrations found in test borings WBR2 and WBR3 (located within the asbestos fill area) to samples taken from WBR1 (considered site background levels) greater differences in concentrations are evident. Concentrations found in WBR2 and WBR3 that are at least twice as great as concentrations found in WBR1 include antimony, chromium, lead (in sample No. 10), nickel, and zinc. In addition, beryllium, cadmium and mercury which were not detected in WBR1 were found in WBR2 and/or WBR3.

2.1.3 Sediment Samples

Three sediment samples (SED-11, SED-12 and SED-16) were collected in proximity to the White Bridge Road Site along Black Brook. Black Brook flows along the southern border of the site in a westerly direction. SED-11 was collected upstream from the site. SED-12 and SED-16 were collected downstream from the site. Specific locations of these samples are not included in the National Gypsum RI Report. Sediments consisted of a sand and detritus in SED-11, black organics and sand in SED-12 and dark organics sediments with sandy silt in SED-16.

Analytical results of these sediment samples along with rinse blanks and trip blanks are presented in Table 2-3. All rinse blanks and trip blanks taken during sediment sampling activities are presented in this table because National Gypsum does not distinguish in their RI which blanks were taken at which asbestos subsite. When discussing the data in the RI Report, all analytical data for all four sites were grouped together. In addition, as indicated

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TABLE 2-2. TRACE CHEMICAL ELEMENT CONTENT OF NATURAL SOILS

Element	Common Range (ppm)	Average Range (ppm)
Antimony	2-10	—
Arsenic	1-50	5
Beryllium	0.1-40	6
Cadmium	0.01-0.7	0.06
Chromium	1-1000	100
Copper	2-100	30
Lead	2-200	10
Mercury	0.01-0.3	0.3
Nickel	5-500	40
Selenium	0.1-2	0.3
Silver	0.01-5	0.05
Zinc	10-300	50

Reference: U.S. EPA of Solid Waste and Emergency Response, HAZARDOUS WASTE LAND TREATMENT, SW-874 (April 1983) Page 273, Table 6.46.

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TABLE 2-3. SUMMARY OF PRIORITY POLLUTANT DATA
SEDIMENT SAMPLES
WHITE BRIDGE ROAD SITE

	SED-11	SED-12	SED-15	FB-1 (2526)	TB-2 (2527)	TB-4 (2556)	TB-5 (2558)
Volatile Organics (ug/kg)							
Methylene chloride	---	4JB	39B	4JB	4JB	---	6B
Trichlorofluoromethane	3JB	---	---	--	---	---	---
Chloroform	10B	2JB	11B	---	---	---	---
Toluene	6JB	2JB	6JB	---	---	---	--
Base Neutrals (ug/kg)							
Naphthalene	18J	24000	---	---			
Acenaphthylene	---	630	---	---			
Acenaphthene	---	6000	---	---			
Diethyl phthalate	140J	---	---	2JB			
Fluorene	---	10000	---	---			
Phenanthrene	---	53000	190J	---			
Anthracene	---	9500	---	---			
Di-n-butyl phthalate	---	---	---	0.6J			
Fluoranthene	---	52000	190J	---			
Pyrene	---	62000	200J	---			
Chrysene	---	24000	---	---			
Benzo(a)anthracene	---	24000	---	---			
Benzo(b)fluoranthene	---	31000	---	---			
Benzo(k)fluoranthene	---	3700	370J	---			
Benzo(a)pyrene	---	18000	---	---			
Benzo(g,h,i)perylene	--	11000	---	---			
Ideno(1,2,3,c,d)pyrene	---	8300	---	---			
Phenols (mg/kg)	3.7	---	0.6	20			

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TABLE 2-3. (CONTINUED)

	SED-11	SED-12	SED-15	FB-1 (2526)	TB-2 (2527)	TB-4 (2556)	TB-5 (2558)
Metals (mg/kg)							
Arsenic	---	---	---	---			
Chromium	11.5	17.3	8.87	---			
Copper	14.9*	43.5*	---	---			
Lead	34.4R	1480R	16.4R	---			
Mercury	---	---	---	---			
Nickel	9.62*	15.4*	---	---			
Silver	---	2.96	---	---			
Zinc	44.1	104	21.3	126			

-- Indicates compound was analyzed for but not detected.
J Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum lower limit but is greater than zero.
B Analyte was found in method blank as well as in sample.
R Indicates spike samples recovery is not within control limits.
* Indicates duplicate analysis is not within control limits.
Blank space indicates that the sample was not analyzed for that parameter.
FB Field Blank or Rinse Blank
TB Trip Blank

from the flags designated as "B," some constituents were present in a laboratory blank. Analytical results from this blank were not presented in the National Gypsum RI Report. Surface water/sediment samples were collected from the same locations and are presented in Figure 2-2.

The organic data consists of the detection of four volatile organics and fifteen base neutral compounds above method detection limits. Chloroform (2-11 µg/kg) and toluene (2-6 µg/kg) were detected in all three samples. Estimated concentrations of methylene chloride (4 and 39 µg/kg) were detected in SED-12 and SED-15, respectively. In addition, 3 µg/kg of trichlorofluoromethane was detected in SED-11 and methylene chloride (4-6 µg/kg) was detected in the rinse and trip blanks.

Fifteen base neutrals were detected in sediment samples SED-11, SED-12 and SED-15 at concentrations ranging from 18 to 62,000 µg/kg. Almost all of these base neutrals were detected in sample SED-12 and are listed in Table 2-3.

Phenols were detected in SED-11 (3.7 µg/kg), SED-15 (0.6 µg/kg), and in the rinse blank (20 µg/kg).

Six metals were detected in these samples at concentrations ranging from 2.96 to 1480 mg/kg. Total metal concentrations for SED-11, SED-12, and SED-15 were chromium (11.5 mg/kg, 17.3 mg/kg, and 8.87 mg/kg); copper (14.9 mg/kg, 43.5 mg/kg and ND); lead (34.4 mg/kg, 1480 mg/kg, and 16.4 mg/kg); nickel (9.62 mg/kg, 15.4 mg/kg and ND); silver (ND, 2.96 mg/kg and ND) and zinc (44.1 mg/kg, 104 mg/kg, and 21.3 mg/kg). In addition, zinc was also detected in the field blank (126 mg/kg). All concentrations of metals fall within the range of standard background levels for natural soils (see Table 2-2) except for the lead concentrations found in SED-12.

2.1.4 Surface Water

Three surface water samples (SW-16, SW-17 and SW-21) were collected in proximity to the White Bridge Road Site along Black Brook. These samples were collected in the same locations as the sediment samples discussed in Section 2.1.3 of this report. SW-16 was collected upstream from the Site. Samples SW-17 and SW-21 were collected downstream from the Site. Specific locations of these samples were not included in the National Gypsum RI Report. Analytical results of these surface water samples along with trip blanks and rinse blanks are presented in Table 2-4. All trip blanks and rinse blanks taken during surface water sampling activities are presented in this table because National Gypsum does not distinguish in their RI which blanks were taken at which asbestos subsite. When discussing the data in the RI report, all analytical data for all four sites were grouped together. In addition, as indicated from the flags designated as "B," some constituents were present in a laboratory blank. Analytical results from this blank were not presented in the National Gypsum RI Report. Surface water locations are presented in Figure 2-2.

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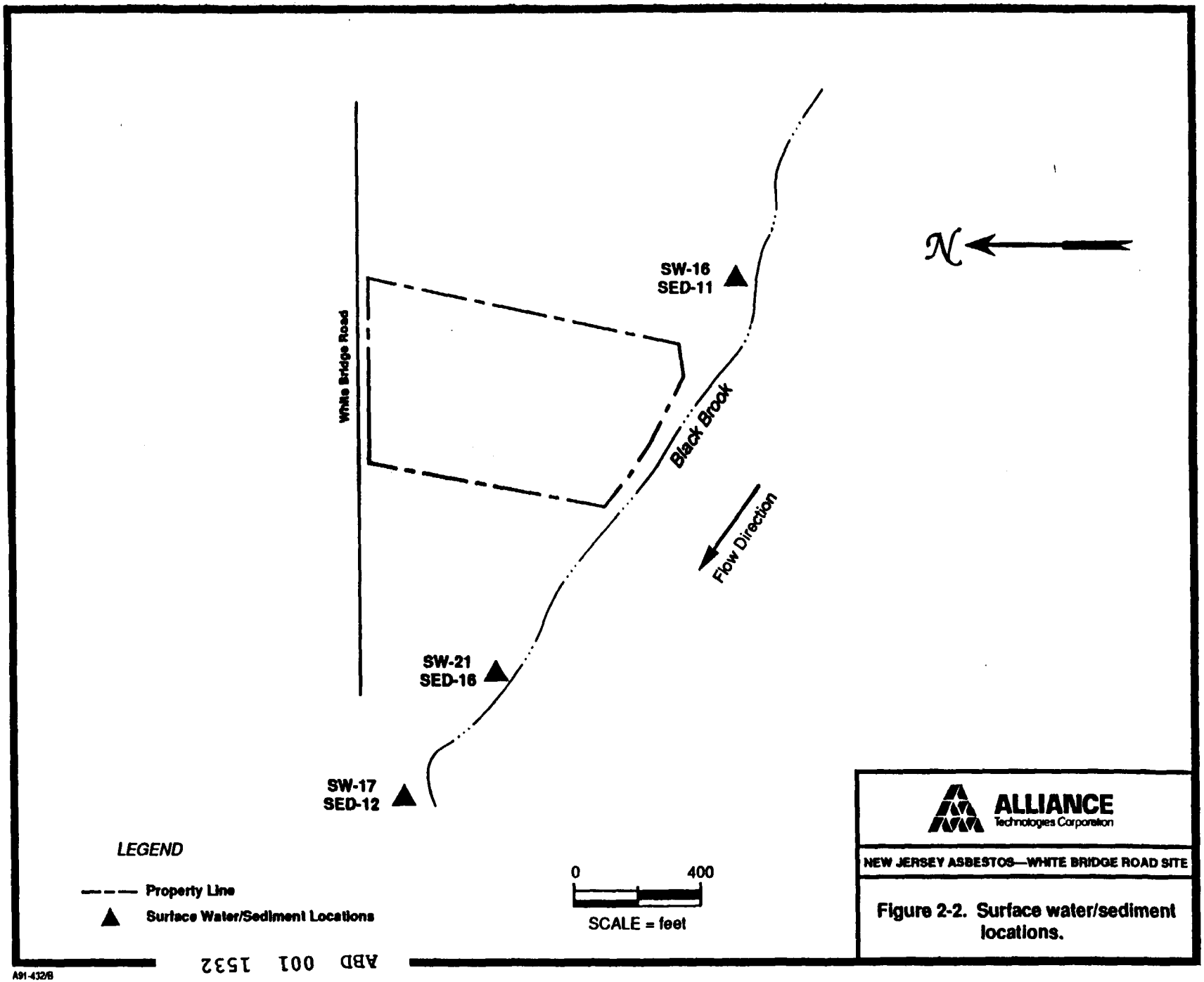

Figure 2-2. Surface water/sediment locations.

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A91-432/B

TABLE 2-4. SUMMARY OF PRIORITY POLLUTANT DATA
SURFACE WATER
WHITE BRIDGE ROAD SITE

	SW-16	SW-17	SW-21	TB-1 (2811)	TB-2 (2527)	TB-3 (2808)	TB-4 (2556)	TB-5 (2558)	FB-2 (2276)
Volatile Organics (ug/l)									
Methylene chloride	—	—	—	4JB	4JB	—	—	6B	38B
Base Neutral Extractables (ug/l)									
Diethyl phthalate	—	1J	—						1J
Di-n-butyl phthalate	2J	1J	—						—
Butylbenzyl phthalate	5J	—	1J						—
Bis-2-ethylhexul phthalate	55J	13	21						—
Phenols (ug/l)	—	—	—						32
Metals (ug/l)									
Lead	6.9	—	—						—
Mercury	—	—	0.54						—
Nickel	—	—	53N						88
Zinc	—	34	—						—

— Indicates compound was analyzed for but not detected.
J Indicates that the concentration listed is an estimated value which is less than the specified minimum lower limit but is greater than zero.
B Analyte was found in the method blank as well as in the sample.
S Indicates value determined by method of standard addition.
Blank spaces indicate that the sample was not analyzed for those parameters.
N Indicates spike recovery is not within control limits.
TB Trip Blank
FB Field Blank or Rinse Blank

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No VOCs were detected in the surface water samples. In the organic fraction of the priority pollutants, four base neutral compounds were detected. All four compounds are classified as phthalate esters. Bis-2-ethylhexyl phthalate was detected in all three samples at concentrations ranging from 13-55 µg/l. All other phthalate esters were detected at levels of 5 µg/l or lower. In addition, the rinse blank contained 1 µg/l of diethyl phthalate. Table 2-5 presents applicable standards and criteria which are commonly used when evaluating surface waters. Diethyl phthalate, di-n-butyl phthalate and bis-2-ethylhexyl phthalate were all detected at levels well below the EPA Ambient Water Quality Criteria (AWQC) (see Table 2-5). No criteria is provided for butyl benzyl phthalate.

Four metals were detected in the surface water samples at concentrations ranging from 0.54-53 µg/l. Total metal concentrations were lead (6.9 µg/l in SW-16); mercury (0.54 µg/l in SW-21); nickel (53 µg/l in SW-21) and zinc (34 µg/l in SW-17). No metals exceeded the Maximum Contaminant Levels (MCLs) listed in the Federal Primary Drinking Water Regulations (PDWR) or the Federal Secondary Maximum Contaminant Levels (SMCLs) listed in the Secondary Drinking Water Regulations (SDWR) (see Table 2-5). The concentration of nickel did exceed the EPA-AWQC. Nickel was also detected in the rinse blank (88 µg/l).

2.1.5 Potable Wells Samples

Three potable well samples (PW-1, PW-2 and PW-10) were collected from three potable wells located in proximity to the site. Approximate potable well sampling locations are presented in Figure 2-3. In addition, direction of ground water flow which was determined in the National Gypsum RI Report, is indicated. All sample were collected from a spigot or tap after three holding tank volumes were removed. Samples were not collected directly from the potable wells.

Potable well sample PW-1 was collected from a residence well located at 658 White Bridge Road. The well was installed in approximately 1968 and is approximately 200 feet deep. Water is extracted for the well via a submersible pump. Sample PW-2 was collected from a resident well located at 697 White Bridge Road. The well was installed in 1955 and its depth is unknown. Water is extracted from the well via a submersible pump. Sample PW-10 was collected from a resident pump located at 651 White Bridge Road. The well is approximately 10 years old and is approximately 200 feet deep. Water is extracted from the well via a submersible pump.

Analytical results of these potable well samples along with rinse blanks and trip blanks are presented in Table 2-6. All trip blanks and rinse blanks taken during potable well sampling activities are presented in this table because National Gypsum does not distinguish in their RI Report which blanks were taken at which asbestos subsite. When discussing the data in their report, all analytical data for all four sites were grouped together. In addition, as indicated from the flags designated as "B," some constituents were present in a laboratory blank. Analytical results from this blank were not presented in the National Gypsum RI Report.

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TABLE 2-5. APPLICABLE STANDARDS AND CRITERIA FOR SURFACE WATER

Primary Drinking Water Regulations (PDWR)[1]

Element	MCL
Cadmium	10 ug/l
Chromium	50 ug/l
Lead	50 ug/l
Mercury	2 ug/l
Silver	50 ug/l

Secondary Drinking Water Regulations (SDWR)[2]

Element	SMCL
Copper	1000 ug/l
Zinc	5000 ug/l

Ambient Water Quality Criteria (AWQC)[3]

Diethyl phthalate	350,000 ug/l
Di-n-butyl phthalate	34,000 ug/l
Bis-2-ethylhexyl phthalate	15,000 ug/l
Cyanide	200 ug/l
Nickel	13.4 ug/l

[1]Primary Drinking Water Regulations, 40 CFR 141, May 1990.
[2]Secondary Drinking Water Regulations, 40 CFR 143, May 1990.
[3]Ambient Water Quality Criteria, September 1986.

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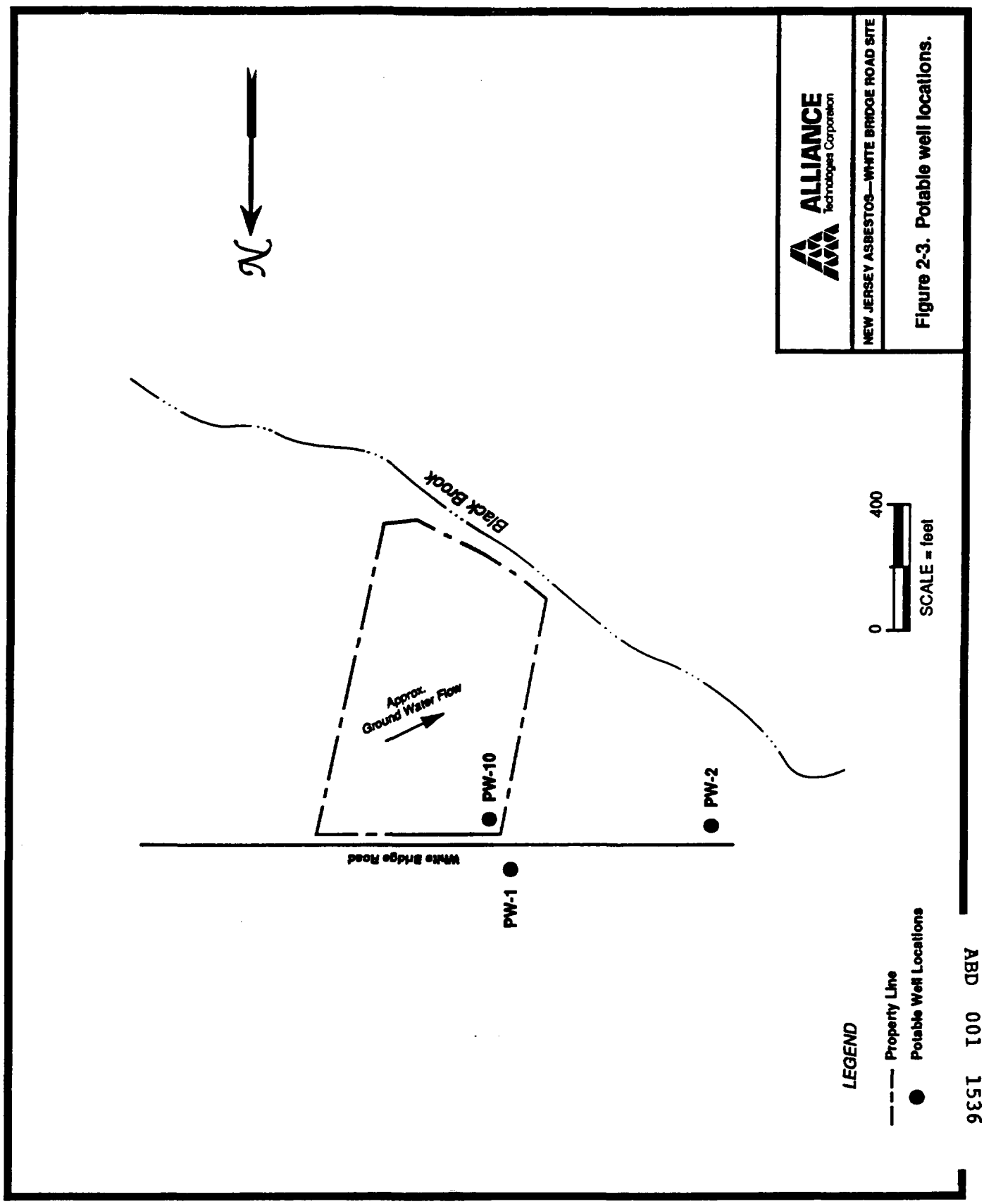
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Figure 2-3. Potable well locations.
N
Black Brook
Approx. Ground Water Flow
PW-10
PW-2
PW-1
White Bridge Road
400
0
SCALE = feet
LEGEND
Property Line
Potable Well Locations

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TABLE 2-6. SUMMARY OF PRIORITY POLLUTANT DATA
POTABLE WELL SAMPLES
WHITE BRIDGE ROAD SITE

	PW-1	PW-2	PW-10	TB (3760)	TB 10/9/86	FB (3757)
Volatile Organics (ug/l)						
Methylene Chloride	5B	5B	9B	6B	5B	5B
Chloroform	---	1JB	1JB	3JB	3JB	2JB
Ethylbenzene	---	2JB	---	---	---	0.7JB
Trichloroethane	---	6	---			
1,1,2,2-Tetrachloroethane	---	3J	---			
Trichlorofluoromethane	---	---	1J			
Base Neutrals (ug/l)						
Butyl benzyl phthalate	---	---	5J			---
Di-n-butyl phthalate	---	---	2J			0.7J
Di-n-octyl phthalate	---	---	---			2JB
Phenols (ug/l)	40	72	32			10
Metals (ug/l)						
Chromium	---	310N	---			
Lead	---	---	---			5.5
Nickel	---	55N				---
Zinc	52N	91N	101N			38N

---	Indicates compound was analyzed for but not detected.
J	Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum lower limit but is greater than zero.
B	Analyte was found in the method blank as well as in the sample
N	Indicates spike sample recovery is not within control limits.
	Blank spaces indicates that the sample was not analyzed for that parameter.
TB	Trip Blank
FB	Field Blank or Rinse Blank

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Volatile organic concentrations were detected in the potable water samples as well as the trip blanks. Methylene chloride was detected in the samples in concentrations ranging from 5-9 µg/l. Chloroform was detected in all trip and rinse blanks and in PW-2 and PW-10 in concentrations ranging from 1-3 µg/l. Ethylbenzene was detected in PW-2 (2 µg/l) and the field blank (0.7 µg/l). PW-2 also contained trichloroethane (6 µg/l) and 1,1,2,2-tetrachloroethane (3 µg/l). PW-10 contained 0.1 µg/l of trichlorofluoromethane. These concentrations were compared to the listed MCLs in the Federal Primary Drinking Water Regulations (PDWR), the listed SMCLs in the Federal Secondary Drinking Water Standards (SDWR) and the New Jersey Ground Water Quality Standards (GWQS). Not all analytes presently have established standards. None of the analytes mentioned above which had established standards exceeded their standards (see Table 2-7).

Two base neutrals were found in potable well sample PW-10. It contained 5 µg/l of butyl benzyl phthalate and 2 µg/l of di-n-butyl phthalate. In addition, di-n-butyl phthalate (0.7 µg/l) and di-n-octyl phthalate (2 µg/l) were detected in the rinse blank. Phenols were detected in all three samples at concentrations ranging from 32 to 72 µg/l as well as in the rinse blank (10 µg/l). As indicated by Table 2-7, no standards were exceeded for constituents that presently have established standards.

Three metals were found in the potable well samples. All three samples contained zinc concentrations ranging from 52-101 µg/l. PW-2 also contained concentrations of chromium (310 µg/l) and nickel (55 µg/l). Concentrations of chromium and zinc were well below the MCLs and RMCLs established in the NJDEP-GWQS, PDWD or SDWD (see Table 2-8). No criteria is presently established for nickel. Lead (5.5 µg/l) and zinc (38 µg/l) were also detected in the trip blank.

2.1.6 Ground Water Samples

Three ground water samples (WBR1, WBR2, and WBR3) were analyzed from monitoring wells installed at the White Bridge Road Site as reported in the National Gypsum RI Report. All three wells were constructed with 10 feet of screen and were advanced to the following depths below surface grade: Monitoring Well WBR1, 14.0 feet; Monitoring Well WBR2, 15.5 feet; and Monitoring Well WBR3, 15.0 feet. Analytical results of these ground water samples along with two trip blanks are presented in Table 2-9. This table was taken from the National Gypsum RI Report. Flags designated as "B" indicate that some of the analytes were found in a laboratory blank as well as the sample. Analytical data from this laboratory blank are not presented in the National Gypsum RI Report. In addition, there is no indication that rinse blanks were taken while obtaining ground water samples at the White Bridge Road property. Ground water sampling locations and the approximate direction of ground water flow which was determined in the National Gypsum RI Report are presented in Figure 2-1.

Overall, a total of eight constituents were found in the ground water. Detectable volatile organics included methylene chloride (6 µg/l) and chloroform (2 µg/l) in monitoring wells

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TABLE 2-7. GROUND WATER QUALITY STANDARDS - NON-METALS

Analyte	NJDEP GWQS[1] (ug/l)	PDWR[2] (ug/l)	SDWR[3] (ug/l)
Volatile Organic Compounds			
Benzene	---	5	---
Chloroform	---	100	---
1,1-Dichloroethane	---	---	---
1,1-Dichloroethene	---	---	---
Ethyl Benzene	---	---	---
Methylene Chloride	---	---	---
Toluene	---	---	---
Trans-1-2,dichloroethene	---	---	---
1,1,2,2-Tetrachloroethane	---	---	---
1,1,1-Trichloroethane	---	200	---
Trichloroethene	---	5	---
Trichlorofluoromethane	---	---	---
Base Neutral Compounds			
Bis(2 chloroisoproply) ether	---	---	---
Bis-2-ethylhexyl phthalate	---	---	---
Butyl benzyl phthalate	---	---	---
Diethyl phthalate	---	---	---
Di-n-butyl phthalate	---	---	---
Di-n-octyl phthalate	---	---	---
2-chlorophenol	---	---	---
Phenols	3500	---	---

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TABLE 2-7. (CONTINUED)

Analyte	NJDEP GWQS[1] (ug/l)	PDWR[2] (ug/l)	SDWR[3] (ug/l)
Pesticides			
Aldrin	0.003	---	---
Alpha-BHC	---	---	---
Beta-BHC	---	---	---
Endrin	0.004	0.2	---
Cyanide	200	---	---
Asbestos[4]	---	7 million fibers/ liter (longer than 10 um)	---

NJDEP New Jersey Department of Environmental Protection
[1]GWQS Ground Water Quality Standards
[2]PDWR Primary Drinking Water Regulations, 40 CFR 141, May 1990.
[3]SDWR Secondary Drinking Water Regulations, 40 CFR 143, May 1990.
[4]Per 40 CFR 141.62 revised 56 FR 3578, January 30, 1991.
--- Indicates that no standard exists for that constituent

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TABLE 2-8. GROUND WATER QUALITY STANDARDS - METALS

Analyte	NJDEP GWQS (ug/l)	PDWR (ug/l)	SDWR (ug/l)
Metals			
Antimony	---	---	---
Arsenic	50	50	---
Beryllium	---	---	---
Cadmium	10	10	---
Chromium	50	50	---
Copper	1000	---	1000
Lead	50	50	---
Mercury	2	2	---
Nickel	---	---	---
Silver	50	50	---
Zinc	5000	---	5000

NJDEP	New Jersey Department of Environmental Protection
GWQS	Ground Water Quality Standards
PDWR	Primary Drinking Water Regulations, 40 CFR 141, May 1990.
SDWR	Secondary Drinking Water Regulations, 40 CFR 143, May 1990.
---	Indicates that no standard exists for that constituent.

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TABLE 2-9. SUMMARY OF PRIORITY POLLUTANT DATA
GROUND WATER MONITORING WELL SAMPLES
WHITE BRIDGE ROAD SITE

	Sample Number			
	WBR1	WBR2	WBR3	WBR4
Volatile Organics (ug/l)				(Trip Blank)
Methylene Chloride	6B	---	6B	13B
Chloroform	2JB	---	2JB	5B
1,1,2,2-Tetrachloroethane	---	---	---	3J
Base Neutrals (ug/l)				
Bis-2-ethylhexyl phthalate	---	21B	---	
Di-n-octyl phthalate	15	27	127	
Metals (ug/l)				
Copper	---	---	23	
Silver	17	---	---	
Zinc	371	78	128	
Phenols (ug/l)	49	45	85	

-- Indicates compound was analyzed for but not detected.
J Indicates that the concentration listed is an estimated value, which is less than the specified minimum lower limit but greater than zero.
B Analyte was found in the method blank as well as in the sample.
Blank space indicates that the sample was not analyzed for that parameter.

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A91-432.tbl

WBR1 and WBR2. In addition, 3 volatile organics (methylene chloride, chloroform and 1,1,2,2-tetrachloroethane) ranging in concentrations from 3-13 µg/l were detected in the trip blank.

Two base neutrals were detected. Di-n-octyl phthalate was detected in all three samples at concentrations ranging from 15-127 µg/l. Bis-2-ethylhexyl phthalate was detected in WBR2 at a concentration of 21 µg/l. Phenols were detected in all samples and ranged in concentrations from 45 to 85 µg/l.

Results of the metal analysis indicate three constituents (copper, silver, and zinc) above detectable concentrations. Zinc was detected in all three samples at concentrations ranging from 78-371 µg/l. Silver was detected in WBR1 (17 µg/l) and copper was detected in WBR3 (23 µg/l).

All analytes described above and listed in Table 2-9 were below the established standards in the NJDEP-GWQS, PDWR or SDWR or presently do not have any established standards.

2.2 Asbestos Contamination

2.2.1 Sources

In October and November 1990, Alliance Technologies Corporation, as contracted by the EPA, performed additional field activities to characterize the lateral and vertical extent of the asbestos fill areas. The tasks performed included: a survey of the site to develop a grid pattern for sampling purposes and topographic maps (see Figure 2-4); a geophysical investigation utilizing ground penetrating radar (GPR) in selected locations; air sampling; soil sampling using hand augers and in some instances, a drill rig; and analysis of the air and soil samples at a National Institute of Standards and Technology (NIST) certified laboratory. Three analytical approaches were used to characterize the extent of contamination. These were: visual screening, polarized light microscopy (PLM), and transmission electron microscopy (TEM).

A GPR survey was performed at the White Bridge Road Site to determine the vertical and spatial extent of the asbestos fill material. Although GPR does not allow detection of asbestos containing material, the GPR method is useful for differentiating between naturally bedded material (soils, sand, clay and peat deposits), and non-natural occurring exotic material dumped at this site composed primarily of asbestos tiles. The purpose of the GPR survey was to assist in identifying the uppermost fill areas. Alliance also used the GPR data (to a lesser degree) to assist in the selection of optimum locations for subsurface borings.

Figure 2-5 shows the locations of the GPR profile traverses collected from the site. Some lines were collected in two portions due to man-made obstructions such as fences. A total of

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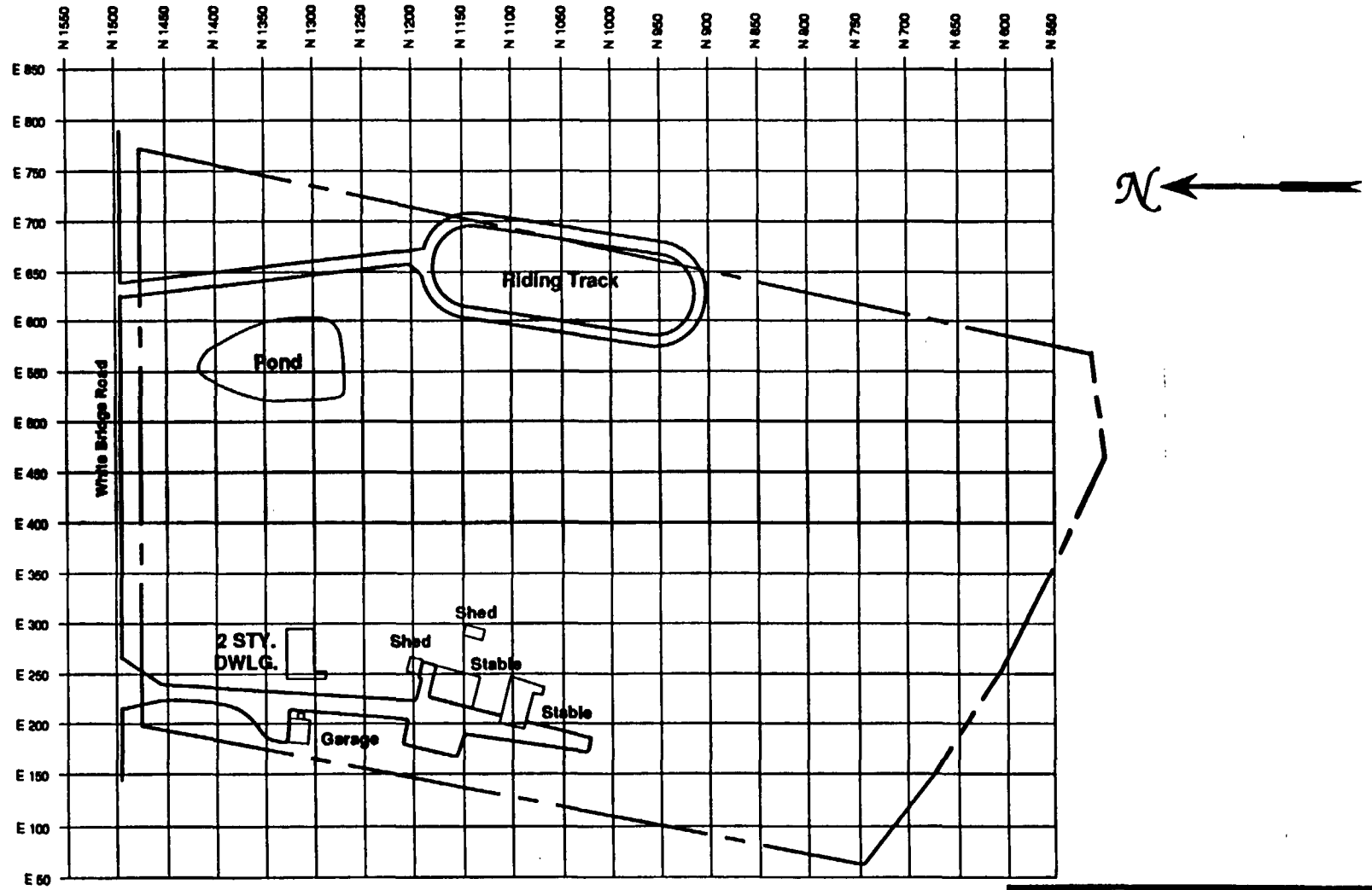

Figure 2-4. Site map with grid.

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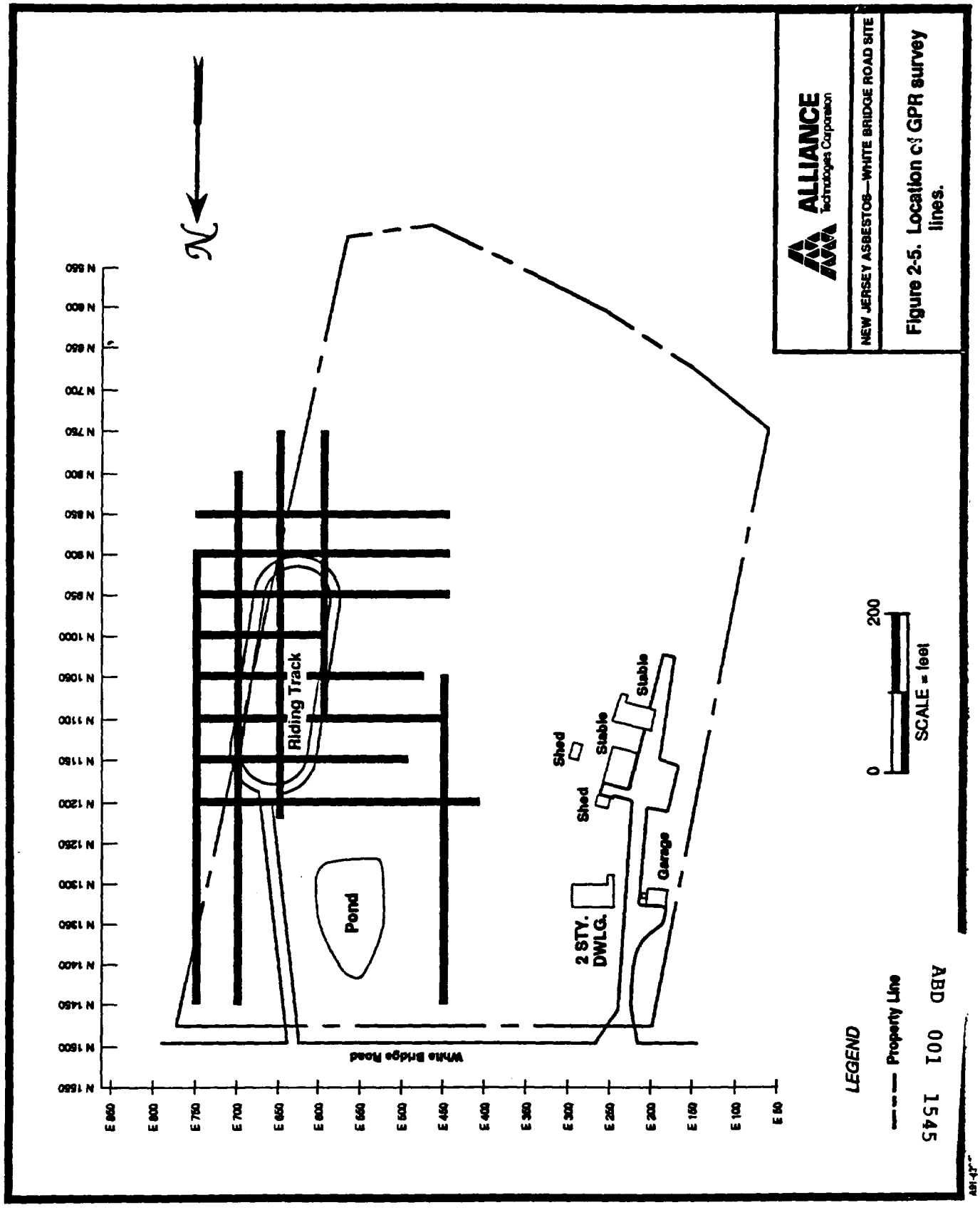
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Figure 2-5. Location of GPR survey lines.
N
Riding Track
Pond
Shed
Shed
Stable
Stable
2 STY. DWLG.
Garage
White Bridge Road
0
200
SCALE = feet
LEGEND
Property Line
ABD 001 1545

6,070 linear feet of GPR data was collected using a 300 Mhz antenna at the site. The radar unit was towed by hand at approximately 1 to 2 feet per second (walking pace). The recording time for each GPR trace was 90 nanoseconds.

The GPR data was most useful in interpreting the thickness of the fill material where the borings data was sparse. Locations and thicknesses of asbestos fill material on the site is discussed later in this report.

Surface and subsurface soil samples were collected at grid nodes located throughout the site. Samples were collected at grid nodes located at 100 foot intervals. Some node locations were not sampled because their locations were not accessible. In areas where grid node points were accessible, but samples were not able to be collected (due to hardness of the ground surface or the lack of soil, etc.), the samples was collected as close as possible to the grid node. No composite samples were collected. Specific grid point locations are included in the analytical results summary presented later in this report in Table 2-11.

Each sample was visually inspected onsite. Samples were not homogeneous throughout the property. Many samples contained asbestos fill material which was very distinguishable from the surrounding subsurface soil due to the presence of tiles, shingles and/or wallboard slurry. If the sample contained any obvious asbestos containing material (i.e., tiles, shingles or wallboard slurry) or any visual asbestos fibers, the sample was analyzed by PLM. PLM is the EPA-recommended method of determining asbestos bulk samples and is more cost effective then TEM. If the sample contained no obvious asbestos containing material or visual asbestos fibers it was analyzed by TEM. TEM provides a more precise measurement of asbestos concentration in samples but is more cost prohibitive.

One of the differences between the methods used in the analysis of soil samples for asbestos is that the TEM method is much more exact and sensitive than the PLM method. This greater degree of exactness and sensitivity is due to the higher resolution provided by an electron microscope over that of a light microscope. With the resolution offered by the electron microscope utilized in the TEM method, it is possible to identify each fiber present in the sample being analyzed and also determine its length, width and thickness. Based upon the dimensions of each fiber present, their mass is calculated and then, using the total mass of the sample, the percentage of asbestos is calculated. The resolution of the light microscope used in the PLM method is much lower and does not allow the measurement of the dimensions of individual fibers. In order to determine the percentage of asbestos in a sample by the PLM method, it is necessary to "estimate" the percentage of asbestos fibers present in the field of view of the microscope according to the EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M-4-82-020, December 1982. The PLM method, therefore, does not offer a percentage based on the weights of the fibers present in the sample as does the TEM method. The difference in the degrees of sensitivities provided by each method is reflected in the lower detection limit of 0.5 percent for the TEM method, as opposed to a higher detection limit of 1.0 percent for the PLM method.

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The reason that the TEM method is deferred in favor of the PLM method when higher asbestos concentrations are expected is that the grid openings used in the TEM method (as cited in the Federal Register, Volume 52, Number 210) become obscured when higher percentages of asbestos are present, making it difficult to count individual fibers and determine their dimensions. Therefore, when a sample, upon visual inspection, exhibits possible asbestos contamination, the PLM method is the preferred method of determining the percentage of asbestos in the sample.

From the analytical results, the extent of asbestos contamination was quantified on the White Bridge Road property. Figure 2-6 presents the locations of asbestos containing material on the surface. In addition to identifying these areas, areas containing asbestos concentrations in excess of 0.5 percent, 1.0 percent and 10 percent are delineated. A larger more detailed map identifying asbestos concentrations at the surface is presented in a fold out map located in the back of this report. From Figure 2-6, approximate surface areas of asbestos fill material were calculated. Table 2-10 presents the surface area calculations from the different asbestos fill areas located on Figure 2-6. These surface areas are calculated for asbestos fill areas which contain asbestos in concentrations greater than 0.5 percent, 1.0 percent and 10 percent at the zero to six-inch interval. From these calculations, approximate total surface areas of asbestos fill material at the surface in excess of 0.5 percent, 1.0 percent and 10 percent are 85,569; 65,080; and 36,760 square feet, respectively.

The thickness of the asbestos fill was determined by the laboratory analysis of 131 shallow subsurface samples, 70 deeper subsurface samples and visual inspection. The location and thickness of the asbestos fill material is presented in Figure 2-7.

In addition, four geologic profiles were developed to better quantify the vertical extent of the asbestos fill areas. The locations of these geologic profiles are presented in Figure 2-8 and are located across the main landfill area along transects E to E′, F to F′, G to G′, and H to H′. These geologic profiles are presented in Figures 2-9 and 2-10.

From Figure 2-7, approximate total volumes of each asbestos fill area were calculated. From these calculations, the total volume of asbestos fill material in all asbestos fill areas located on the site is approximately 21,324 cubic yards.

2.2.2 Surface Soils

This section presents the results of the asbestos levels found in the surface soil sampled during the field investigation performed by EPA in October and November 1990. No surface soil samples were collected during the National Gypsum RI.

A total of 131 surface soil samples were collected and analyzed for asbestos concentrations during the field investigation program. These surface soil samples were collected from the 0 to 6" interval. Analytical results are presented in Table 2-11. In addition, shallow subsurface

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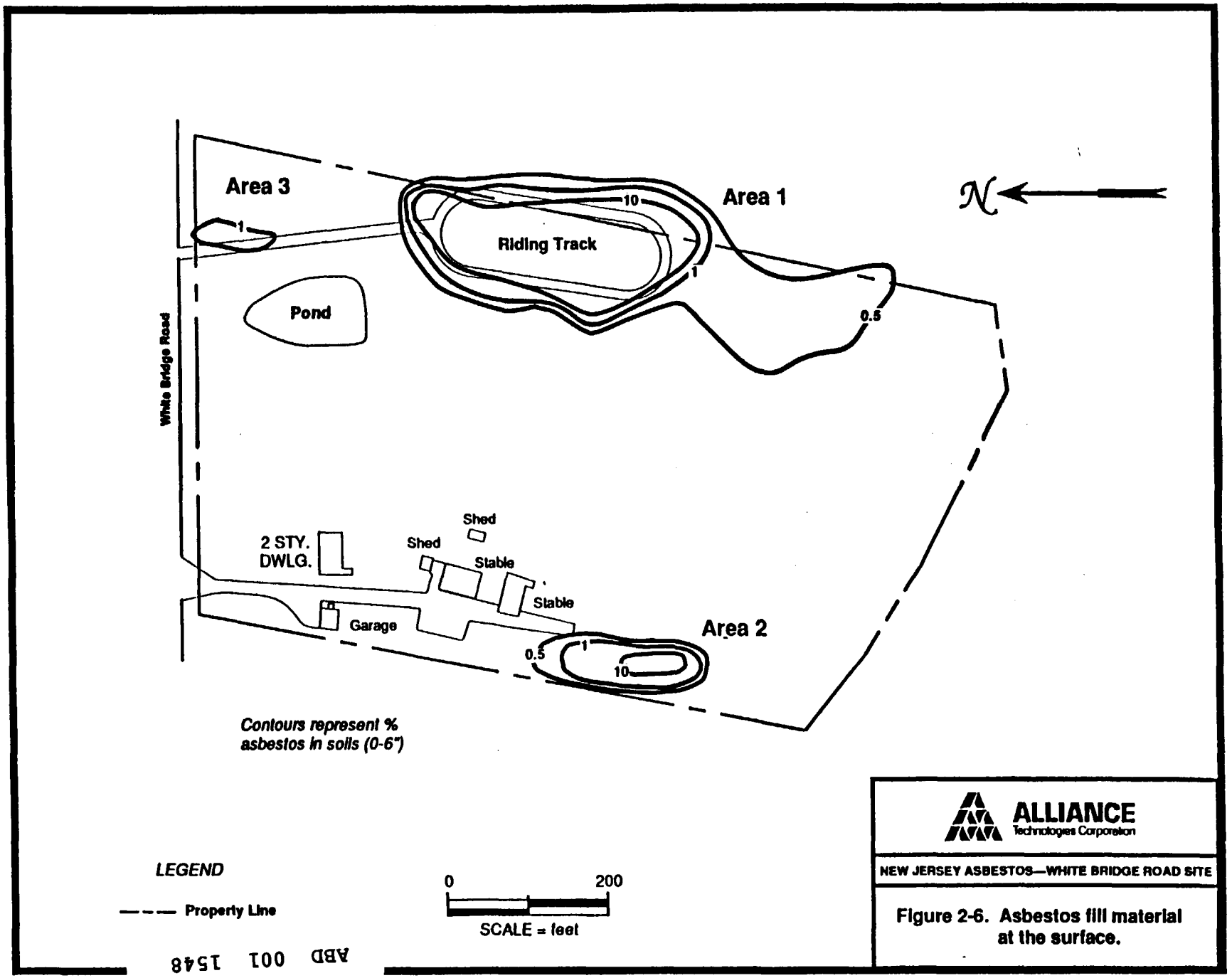

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TABLE 2-10. SURFACE AREAS OF ASBESTOS FILL MATERIAL AT THE SURFACE (0-6") (SQUARE FEET)

Area No.	In excess of 0.5 percent	In excess of 1.0 percent	In excess of 10 percent
1	71,902	57,800	35,160
2	12,467	7,200	1,600
3	1,200	0	0
Totals	85,569	65,080	36,760

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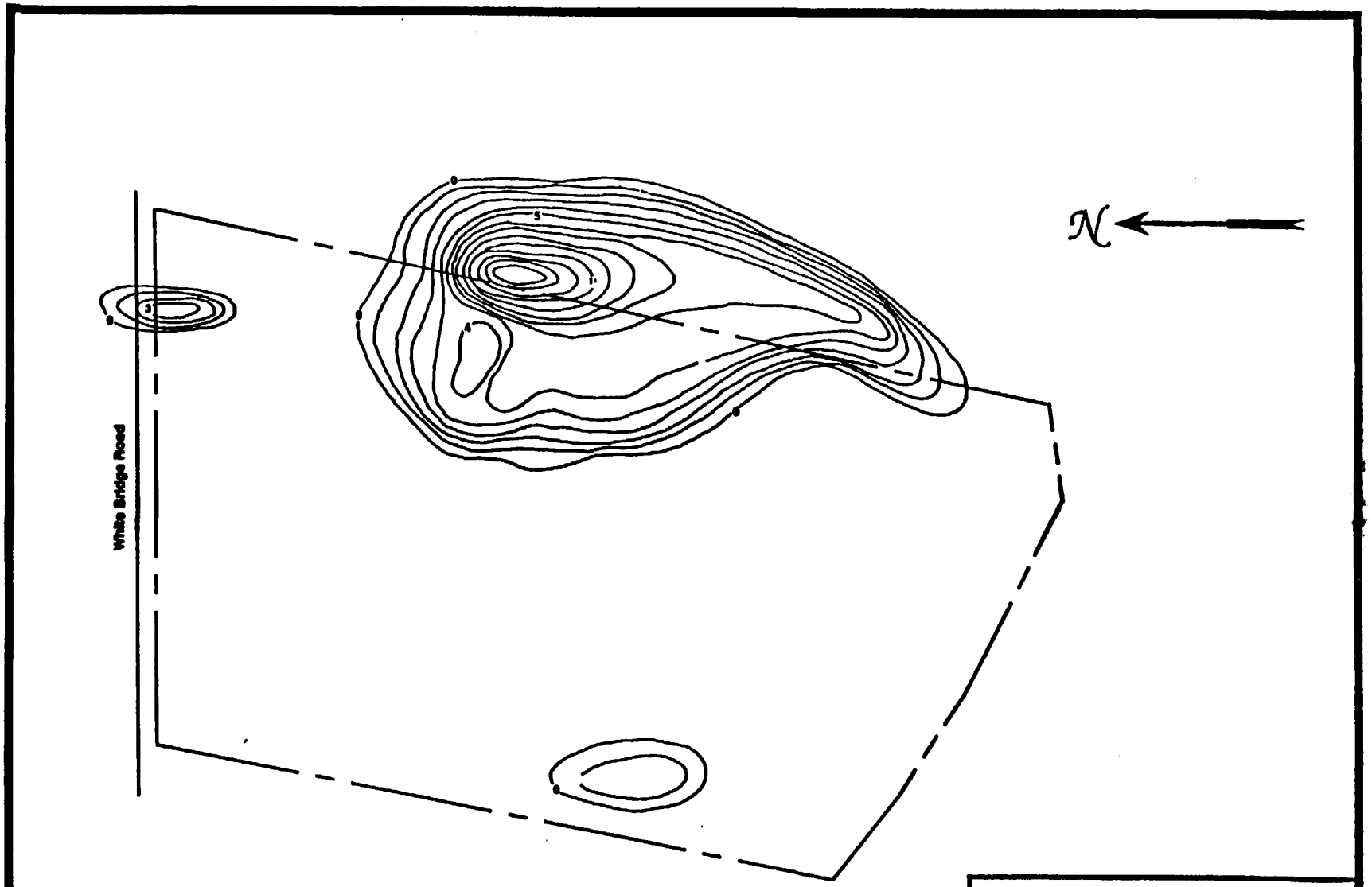

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NEW JERSEY ASBESTOS—WHITE BRIDGE ROAD SITE

Figure 2-7. Thickness of asbestos fill material.

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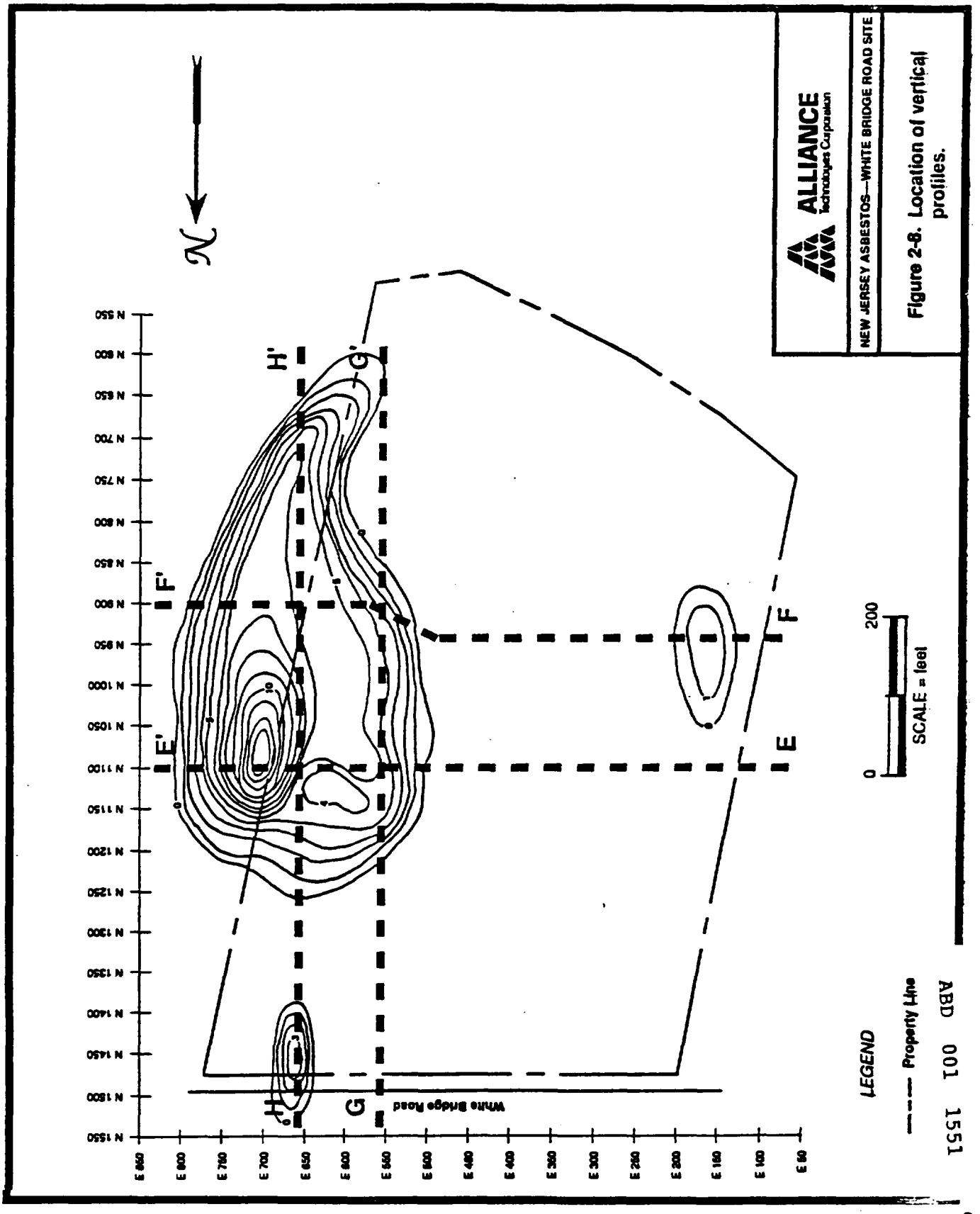
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Figure 2-8. Location of vertical profiles.
N
H'
G'
F'
F
E'
E
H
G
White Bridge Road
0
200
SCALE = feet
LEGEND
Property Line
ABD 001 1551

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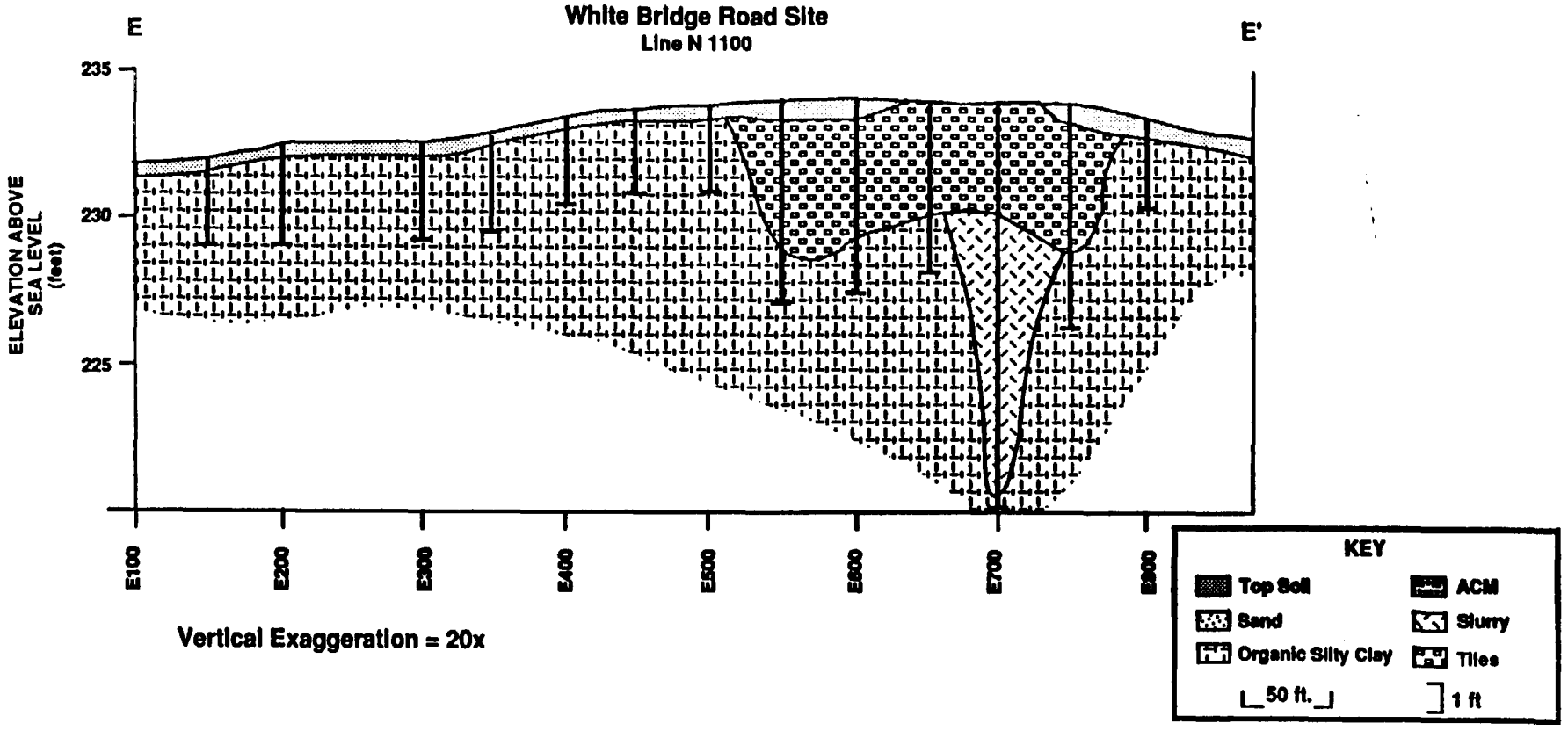

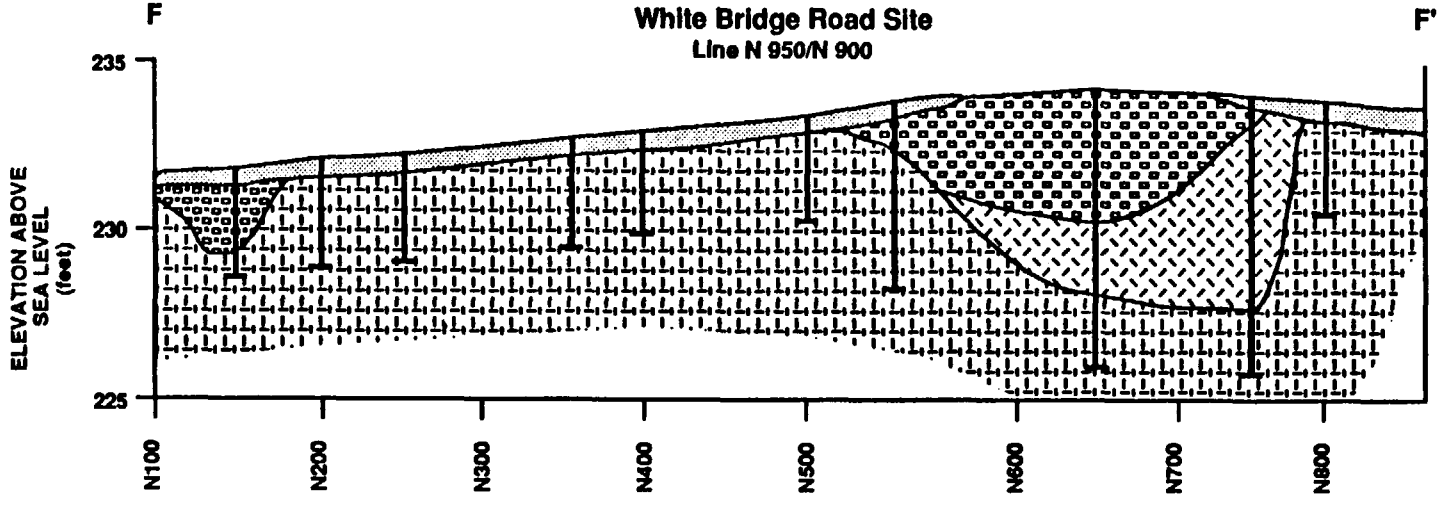

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Figure 2-9. East West Cross Sections.

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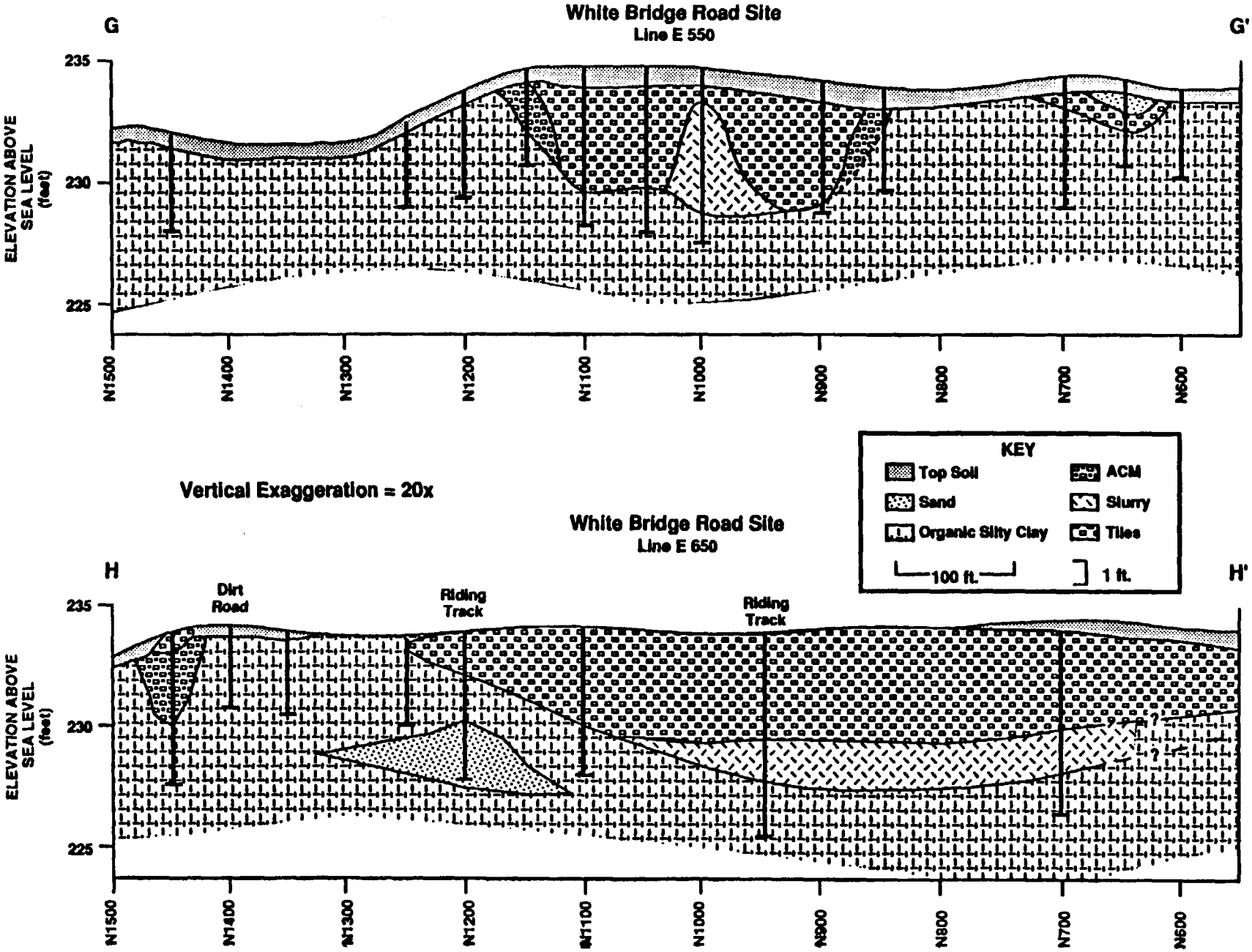

Figure 2-10. North South Cross Sections.

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TABLE 2-11. ANALYTICAL RESULTS SUMMARY - WHITE BRIDGE ROAD

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N 600 E 500	-10/31-	6	0		
N 600 E 550	-10/31-	6	0		
N 600 E 600	-11/1-	6	0.002181		
N 600 E 600	-11/1-	18	0		
N 650 E 450	-10/31-	6	0		
N 650 E 500	-10/31-	6	0		Lab duplicate
N 650 E 500	-10/31-	6	0.000270		Lab duplicate
N 650 E 500	-10/31-	18	0		
N 650 E 550	-10/31-	6	0		
N 650 E 600	-11/1-	6 A	1.060388	< 1.0	
N 650 E 600	-11/1-	6 B		< 1.0	Lab duplicate
N 650 E 600	-11/1-	6 B		< 1.0	Lab duplicate
N 650 E 650	-11/1-	6	0		
N 700 E 450	-10/31-	6	0		
N 700 E 550	-11/2-	6		10.0	
N 700 E 650	-11/1-	6	0		
N 750 E 400	-10/31-	6	0.015706		
N 750 E 400	-10/31-	18	0.003578		Lab duplicate
N 750 E 400	-10/31-	18	0.016831		Lab duplicate
N 750 E 500	-10/31-	6	0.001113		
N 750 E 500	-10/31-	18	0		
N 750 E 600	-11/2-	6	0.163962		
N 750 E 600	-11/2-	48	0		Lab duplicate
N 750 E 600	-11/2-	48	0		Lab duplicate
N 750 E 750	-11/1-	6	0		
N 800 E 300	-10/31-	6	0		Lab duplicate
N 800 E 300	-10/31-	6	0		Lab duplicate
N 800 E 400	-10/31-	6	0.003776		
N 800 E 500	-10/31-	6 A		0.0	Field/Lab duplicate
N 800 E 500	-10/31-	6 A		< 1.0	Lab duplicate
N 800 E 500	-10/31-	6 B		< 1.0	Field duplicate
N 850 E 150	-10/31-	6	0.001789		
N 850 E 150	-10/31-	18	0.000673		
N 850 E 300	-10/31-	6	0		

PLM - Polarized Light Microscopy; TEM - Transmission Electron Microscopy
TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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TABLE 2-11. (CONTINUED)

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N 850 E 500	-10/31-	6	0.000299		
N 850 E 500	-10/31-	18	0		
N 850 E 550	-11/2-	6		0.0	
N 850 E 600	-11/2-	6	0.330782	< 1.0	
N 850 E 750	-11/1-	6	0		Lab Duplicate
N 850 E 750	-11/1-	6	0.000408		Lab Duplicate
N 850 E 750	-11/1-	18	0		
N 900 E 100	-10/31-	6	0.001116		
N 900 E 100	-10/31-	18	0		
N 900 E 150	-10/31-	6		20.0	
N 900 E 300	-10/31-	6 A	0.000612		Field duplicate
N 900 E 300	-10/31-	6 B	0.003081		Field duplicate
N 900 E 300	-10/31-	18 A	0		
N 900 E 400	-10/31-	6	0.000572		
N 900 E 400	-10/31-	18	0		
N 900 E 500	-10/31-	6	0		
N 900 E 550	-10/31-	6		0.0	
N 900 E 650	-11/2-	6		15.0	
N 950 E 100	-10/31-	6	0.001961		
N 950 E 100	-10/31-	18	0.001087		
N 950 E 200	-10/31-	6	0		
N 950 E 500	-10/31-	6	0		
N 950 E 800	-11/1-	6 A	0		Field Duplicate
N 950 E 800	-11/1-	6 B	0		Field Duplicate
N1000 E 150	-10/31-	6		5.0	
N1000 E 200	-10/31-	6	0.003483		
N1000 E 200	-10/31-	18	0		
N1000 E 250	-10/31-	6	0.000646		
N1000 E 350	-10/31-	6	0.000193		Lab duplicate
N1000 E 350	-10/31-	6	0.003162		Lab duplicate
N1000 E 350	-10/31-	18	0		
N1000 E 400	-10/31-	6	0		
N1000 E 500	-10/31-	6	0.000285		
N1000 E 550	-10/31-	6		5.0	

PLM - Polarized Light Microscopy; TEM - Transmission Electron Microscopy

TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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TABLE 2-11. (CONTINUED)

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N1050 E 450	-10/30-	6	0		
N1050 E 500	-10/30-	6		0.0	
N1050 E 550	-11/1-	6		0.0	
N1050 E 800	-11/1-	6	0		
N1100 E 100	-10/31-	6	0.000204		Lab duplicate
N1100 E 100	-10/31-	6	0		Lab duplicate
N1100 E 150	-10/31-	6	0.034650		
N1100 E 150	-10/31-	18	0.000493		
N1100 E 200	-10/31-	6	0.000405		
N1100 E 200	-10/31-	18	0		
N1100 E 300	-10/30-	6	0.001695		Field Duplicate
N1100 E 300	-10/31-	6	0.006048		Field Duplicate
N1100 E 300	-10/30-	18	0		Field Duplicate
N1100 E 300	-10/31-	18	0		Field Duplicate
N1100 E 350	-10/30-	6	0.027969		
N1100 E 350	-10/30-	18	0.000283		
N1100 E 400	-10/30-	6	0.002123		
N1100 E 400	-10/30-	18	0		
N1100 E 450	-10/30-	6	0.000387		
N1100 E 450	-10/30-	18	0		
N1100 E 500	-10/30-	6	0		
N1100 E 550	-10/30-	6	0.546812		
N1100 E 550	-10/30-	18	0.434025		
N1100 E 600	-11/1-	6		5.0	
N1100 E 650	-11/2-	6		0.0	
N1100 E 650	-11/2-	24		20.0	
N1100 E 700	-11/1-	6		5.0	
N1100 E 750	-11/2-	6	0.043027		
N1100 E 750	-11/2-	24	0.017218		Lab duplicate
N1100 E 750	-11/2-	24	0.005544		Lab duplicate
N1100 E 750	-11/2-	96	0.043027		
N1100 E 800	-11/2-	6	0		
N1150 E 350	-10/29-	6	0.000315		
N1150 E 400	-10/29-	6	0		

PLM - Polarized Light Microscopy; TEM - Transmission Electron Microscopy
TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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TABLE 2-11. (CONTINUED)

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N1150 E 400	-10/29-	18	0		Lab duplicate
N1150 E 400	-10/29-	18	0		Lab duplicate
N1150 E 450	-10/29-	6	0		
N1150 E 450	-10/29-	18	0		
N1150 E 500	-10/29-	6	0.000868		
N1150 E 550	-10/30-	6	0.011684		
N1150 E 800	-11/1-	6	0		
N1200 E 100	-10/31-	6	0		
N1200 E 100	-10/31-	18	0		
N1200 E 150	-10/31-	6 A	0		
N1200 E 350	-10/29-	6 A	0		Lab duplicate
N1200 E 350	-10/29-	6 A	0		Lab duplicate
N1200 E 350	-10/29-	18 A	0		
N1200 E 350	-10/29-	18 B	0.000371		Field duplicate
N1200 E 350	-10/29-	36 B	0		
N1200 E 400	-10/29-	6 A	0.001021		
N1200 E 450	-10/29-	6	0		
N1200 E 450	-10/29-	18	0.000306		
N1200 E 450	-10/29-	36	0		Lab duplicate
N1200 E 450	-10/29-	36	0		Lab duplicate
N1200 E 500	-10/29-	6 A	0		Field duplicate
N1200 E 500	-10/29-	18 A	0		Field duplicate
N1200 E 500	-10/29-	6 B	0		Field duplicate
N1200 E 500	-10/29-	18 B	0		Field duplicate
N1200 E 550	-10/30-	6 A	0		
N1200 E 550	-10/30-	18 A	0		
N1200 E 550	-10/30-	18 B	0		
N1200 E 650	-11/2-	24		5.0	Lab duplicate
N1200 E 650	-11/2-	24		4.0	Lab duplicate
N1200 E 700	-11/1-	6		15.0	
N1200 E 750	-11/1-	6	0.000374		
N1200 E 750	-11/1-	18	0		
N1217 E 587	-10/30-	6	0.037740	< 1.0	
N1250 E 250	-10/30-	6		0.0	
N1250 E 300	-10/30-	6	0.006313		

PLM – Polarized Light Microscopy; TEM – Transmission Electron Microscopy

TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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TABLE 2-11. (CONTINUED)

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N1250 E 300	-10/30-	18	0.000448		
N1250 E 350	-10/29-	6 A	0		
N1250 E 400	-10/29-	6	0.004118		
N1250 E 450	-10/29-	6 A	0.000856		Field duplicate
N1250 E 450	-10/29-	6 B		0.0	Field duplicate/Lab
N1250 E 450	-10/29-	6 B		0.0	Field duplicate/Lab
N1250 E 500	-10/29-	6	0		
N1250 E 500	-10/29-	18	0		
N1250 E 550	-10/30-	6	0		
N1250 E 550	-10/30-	18	0		
N1250 E 600	-10/30-	6	0		
N1250 E 600	-10/30-	18	0		
N1250 E 650	-10/30-	6		0.0	
N1250 E 800	-11/1-	6	0		
N1300 E 350	-10/30-	6 A	0		Field duplicate
N1300 E 350	-10/30-	6 B	0		Field duplicate
N1300 E 350	-10/30-	18 A	0		Field duplicate
N1300 E 350	-10/30-	18 B	0		Field duplicate
N1300 E 400	-10/29-	6	0.003192		
N1300 E 400	-10/29-	18	0		
N1300 E 450	-10/30-	6	0		Lab duplicate
N1300 E 450	-10/30-	6	0		Lab duplicate
N1300 E 450	-10/30-	18	0		Lab duplicate
N1300 E 450	-10/30-	18	0		Lab duplicate
N1300 E 500	-10/30-	6		0.0	Lab duplicate
N1300 E 500	-10/30-	6		0.0	Lab duplicate
N1300 E 500	-10/30-	18	0		
N1300 E 700	-11/1-	6	0.000501		
N1350 E 400	-10/30-	6	0.000222		
N1350 E 450	-10/30-	6	0		
N1350 E 450	-10/30-	18	0		
N1350 E 500	-10/30-	6	0		
N1350 E 500	-10/30-	18	0		
N1350 E 650	-10/30-	6	0.006597		
N1350 E 650	-10/30-	18	0		

PLM – Polarized Light Microscopy; TEM – Transmission Electron Microscopy

TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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TABLE 2-11. (CONTINUED)

Grid Point	Sampling Date	Depth (inches)	Analytical Technique		Comments
			TEM % Asbestos	PLM % Asbestos	
N1350 E 800	-11/1-	6	0		
N1400 E 250	-10/30-	6	0.001273		
N1400 E 250	-10/30-	18	0		
N1400 E 300	-10/30-	6	0		
N1400 E 300	-10/30-	18	0		
N1400 E 350	-10/30-	6	0.000376		
N1400 E 350	-10/30-	18	0		
N1400 E 400	-10/30-	6 A	0		Field duplicate
N1400 E 400	-10/30-	6 B	0		Field duplicate
N1400 E 400	-10/30-	18 A	0		Field duplicate
N1400 E 400	-10/30-	18 B	0		Field duplicate
N1400 E 450	-10/30-	6	0		
N1400 E 450	-10/30-	18	0		
N1400 E 500	-10/30-	6	0		
N1400 E 500	-10/30-	18	0		
N1400 E 600	-10/30-	6	0		Lab duplicate
N1400 E 600	-10/30-	6	0.000229		Lab duplicate
N1400 E 600	-10/30-	18	0		
N1400 E 650	-10/30-	6	0.479973	< 1.0	
N1450 E 250	-10/30-	6	0.095782	< 1.0	
N1450 E 450	-10/30-	6	0		
N1450 E 450	-10/30-	18	0		Lab duplicate
N1450 E 450	-10/30-	18	0		Lab duplicate
N1450 E 500	-10/30-	6	0.000377		
N1450 E 550	-10/30-	6	0.000666		
N1450 E 600	-10/30-	6	0		Lab duplicate
N1450 E 600	-10/30-	6	0		Lab duplicate
N1450 E 600	-10/30-	18	0		
N1450 E 650	-11/1-	6	0.971433	< 1.0	
N1450 E 700	-11/1-	6	0.000347		
N1450 E 700	-11/1-	18	0		
			TEM	PLM	
Total Number of Analyses			176	33	

PLM – Polarized Light Microscopy; TEM – Transmission Electron Microscopy
TEM method detection limit is 0.5 %. PLM detection Limit is 1 %.

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soil samples, collected at greater depths up to 96 inches are also presented on the table and are discussed in Section 2.2.3. This table also presents grid locations for each sample. Corresponding grid locations are presented in Figure 2-4. Of these 131 samples, 109 or approximately 83 percent were analyzed by TEM. As previously discussed, where visual inspection of surface soil samples indicated higher asbestos concentrations, PLM was utilized to determine asbestos concentration. Detection limits for TEM and PLM were 0.5 and 1.0 percent, respectively. Although the detection limits for TEM is 0.5 percent, lower calculated theoretical values are presented in Table 2-10 to better quantify asbestos concentrations. Locations of surface asbestos concentrations are presented in Figure 2-6.

Of the 131 samples, 63 or approximately 48 percent contained measurable quantities of asbestos. Asbestos concentrations ranged from 0 to 20 percent. Of the 109 surface samples analyzed by TEM, three sample contained asbestos concentrations above the method detection limit of 0.5 percent. Asbestos concentrations of samples analyzed by PLM were higher. Of the 30 surface samples analyzed by PCM, eight contained asbestos concentrations greater than the method detection limit of one percent. Asbestos concentrations ranged from zero to 20 percent with four samples containing asbestos concentrations greater than 10 percent (grid points (N1000 E550, N1037 E550 and duplicate, N1150 E800 and N1250 E250).

2.2.3 Subsurface Soils

This section presents the results of the asbestos levels found in subsurface soil samples collected during the field investigation. All subsurface soil samples collected during the National Gypsum RI were collected from three test borings. These samples were not analyzed for asbestos.

EPA's contractor collected and analyzed 70 subsurface soil samples during their field investigation. Analytical subsurface soil results are presented in Table 2-10. Of these 70 samples, 59 were collected at a depth of 18 inches, five at a depth of 24 inches, three at a depth of 36 inches, and one at a depth of 96 inches.

Subsurface samples were analyzed by TEM and PLM. Of the 70 samples, 16 or 23 percent contained measurable quantities of asbestos. Only two samples contained an asbestos concentration above method detection limits.

In addition to the chemical analysis performed on the subsurface soil samples, field identification of probable asbestos fill material was performed based on whether the observed material appeared to be native soil or asbestos fill. As previously discussed, this identification was straightforward in the field since the asbestos fill material consisted of tiles, shingles, and wallboard slurry. From this visual investigation, locations and thickness of asbestos fill material were determined. This information is presented in Figure 2-7.

The large majority of the subsurface asbestos fill was found in the east central portion of the property. This area (approximately 16,000 square yards) contained asbestos at the surface and at depths to 12 feet. This fill area contains approximately 20,500 cubic yards of asbestos fill and represents approximately 96 percent of the total volume of asbestos fill material found on the site. Vertical cross sections of this area are located on Figure 2-8 and presented in Figures 2-9 and 2-10.

Two smaller asbestos fill areas exist on the property. One is located along the southwestern boundary and the other is located adjacent to the northeastern boundary, along White Bridge Road.

Since the thickness and locations of asbestos fill material are based on preliminary field judgements and not laboratory analysis, some material identified in the field as native soil may indeed contain some amount of asbestos. This is especially true for surface soil and sediments bordering the filled debris areas. Therefore, area and volume estimates should be considered minimum estimates since additional asbestos may be present, but may have been identified as native soil or sediment.

2.2.4 Ground Water

Analysis of ground water at the site is limited to the National Gypsum RI. No onsite or offsite ground water samples were collected during EPA's field investigation, as performed by Alliance.

Three onsite ground water samples were collected during the National Gypsum RI. Ground water samples were obtained from monitoring wells located around the perimeter of the main asbestos fill area (see Figure 2-1). In addition, three offsite ground water sources were sampled and subsequently analyzed. These samples were obtained from potable wells located around the perimeter of the site (see Figure 2-3).

All ground water and potable well samples analyzed in the National Gypsum RI contained asbestos fiber concentrations below the reported detection limit of 100,000 fibers per liter. The National Primary Drinking Water Regulations (PDWRs) (40 CFR 141.62 revised by 56 FR 3578, January 20, 1991) promulgated a MCL for asbestos of 7,000,000 fibers per liter.

2.2.5 Surface Water

Three surface water samples were collected near the site during the National Gypsum RI. The samples were collected in Black Brook. Sample SW-16 was collected upstream from the site. Samples SW-17 and SW-21 were collected downstream from the site. Specific locations of these samples were not included in the National Gypsum RI Report. No surface water samples were collected during EPA's 1990 field investigation, as performed by Alliance.

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All three surface water samples contained asbestos concentrations above method detection limits. Asbestos concentrations were 1,000,000 fibers/liter in SW-16 (upgradient to the site) and 2,000,000 and 300,000 fibers/liter at downgradient locations SW-17 and SW-21, respectively. All of these concentration levels are below the PDWRs MCL for asbestos of 7,000,000 fibers per liter.

2.2.6 Sediments

Three sediment samples (SED-11, SED-12 and SED-16) were collected near the site during the National Gypsum RI. These three samples were collected in the same locations as the surface water samples discussed in Section 2.2.5. Sediment sample locations are presented in Figure 2-2. No sediment samples were collected during EPA's 1990 field investigation, as performed by Alliance.

No asbestos concentrations above method detection limits of 0.5 percent for TEM were detected in SED-11, SED-12, or SED-16.

2.2.7 Air

Ambient air samples were taken and analyzed for asbestos fiber concentrations during the National Gypsum RI and Alliance's 1990 field investigation. All air samples were analyzed by PLM using sampling method NIOSH 7400. With this procedure, the detection limit varies with the volume of air sampled. The detection limit for samples collected during the National Gypsum RI was 0.1 fiber/cc. Detection limit ranges for samples collected during EPA's 1990 Field Investigation, as performed by Alliance, were between 0.0003 to 0.0020 fiber/cc.

During the National Gypsum RI, a total of three air samples (WBR1, WBR3, and WBR4) plus one replicate sample (WBR2) were collected. These samples were collected during drilling activities. The primary objective was to determine if significant amounts of asbestos fibers would be released during any drilling activities that might be undertaken as a remedial action and to predict the air quality impact at the site boundary. National Gypsum did not indicate which samples correspond to which sample areas; however, air samples were taken near the locations where the monitoring wells were installed which are presented in Figure 2-1.

During the National Gypsum RI, no asbestos air concentrations above the method detection limits of 0.1 fibers/cc were detected in WBR1, WBR2, WBR3 and WBR4.

A total of 29 outdoor air samples were collected during Alliance's 1990 field investigation. In addition, ten field blanks were taken. These samples were collected upwind, downwind, and on the site during the operation of field activities. Air sampling locations are presented in Figure 2-11. Except for one field blank taken on November 1, 1990, asbestos air concentrations ranged from 0 to 0.012 fibers/cc. Analytical results from this air monitoring are presented in Table 2-12.

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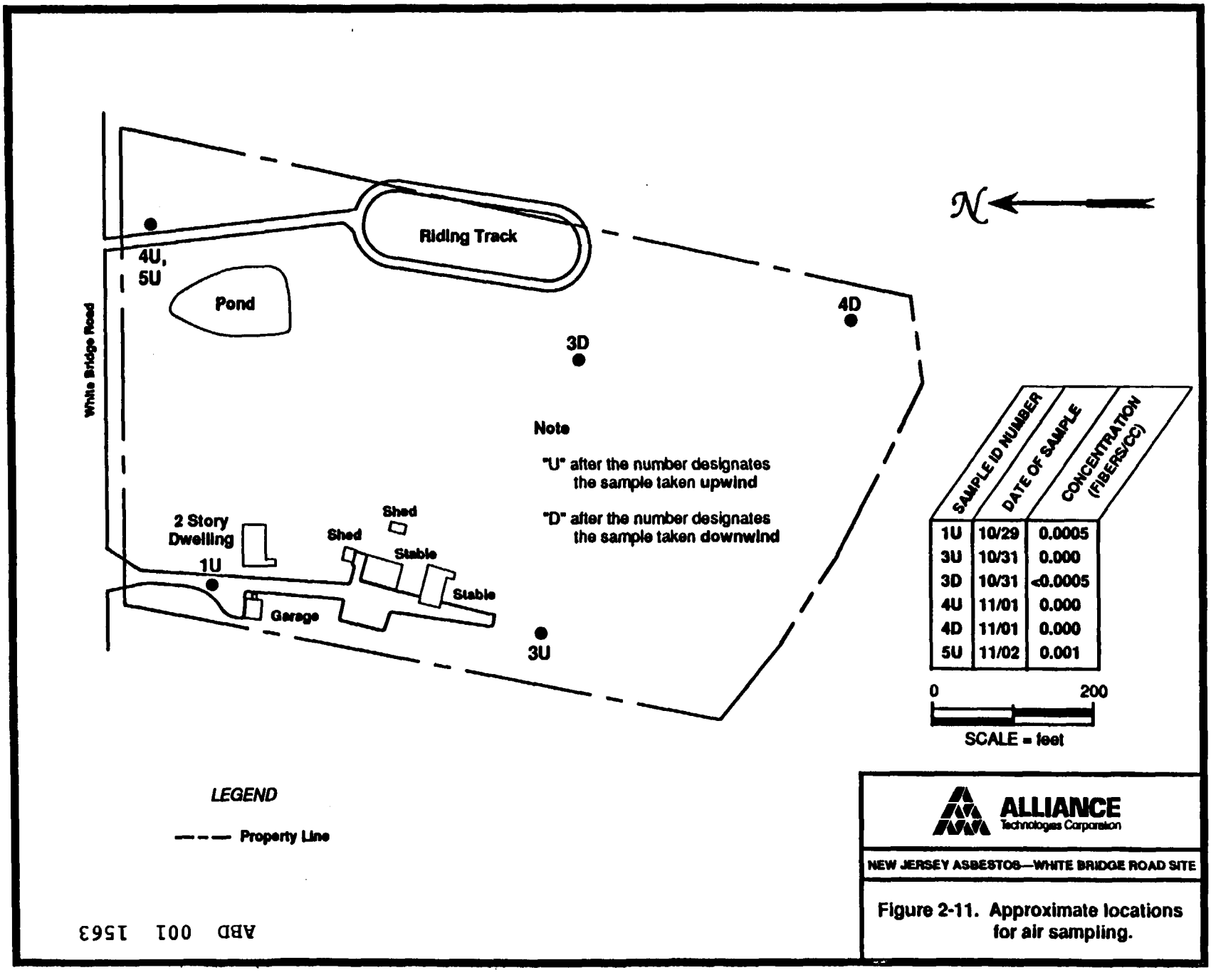

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TABLE 2-12. AIR MONITORING RESULTS AT THE WHITE BRIDGE ROAD SITE

Date of Collection	Type of Sample	Sample I.D.	Sample Location	Sampling Period	Volume Collected (liters)	Concentration (fibers/cc)	Detection Limits (fibers/cc)
Oct. 29	Area	AMB-10/29-UP	Upwind	1456 - 1640	1,040	0.0005	0.0005
		AMB-10/29-DOWN	Downwind	1458 - 1635	970	<0.0005	0.0005
		AMB-10/29-DOWN (Dup.)	Downwind	1458 - 1635	970	0.001	0.0005
	Personal	AMB-10/29-1	Tom L.	1412 - 1629	274	0.002	0.0018
		AMB-10/29-2	Julia I.	1413 - 1633	280	0.004	0.0018
		AMB-10/29-3	Ron P.	1416 - 1631	270	0.002	0.0018
		AMB-10/29-FB1 (Blank)	Field Blank	NA	0 (a)	0.000	0
		AMB-10/29-FB2 (Blank)	Field Blank	NA	0 (a)	0.000	0
Oct. 30	Area	AMB-10/30-UP	Upwind	0930 - 1159	1,490	0.001	0.0003
		AMB-10/30-UP (Dup.)	Upwind	0930 - 1159	1,490	0.000	0.0003
		AMB-10/30-DOWN	Downwind	0919 - 1204	1,650	<0.0003	0.0003
	Personal	AMB-10/30-01	Maria D.	1336 - 1652	392	0.006	0.0013
		AMB-10/30-02	Bob M.	1337 - 1655	396	0.001	0.0012
		AMB-10/30-03	Rick R.	1340 - 1705	410	0.002	0.0012
		AMB-10/30-FB1	Field Blank	NA	0 (a)	0.000	0
		AMB-10/30-FB2	Field Blank	NA	0 (a)	0.000	0
Oct. 31	Area	AMB-10/31-UP	Upwind	0850 - 1715	1,010	0.000	0.0005
		AMB-10/31-DN	Downwind	0900 - 1700	960	<0.0005	0.0005
	Personal	AMB-10/31-01	Julia I.	1410 - 1720	380	0.010	0.0013
		AMB-10/31-01 (Dup.)	Julia I.	1410 - 1720	380	0.012	0.0013
		AMB-10/31-02	Ron P.	1345 - 1650	388	0.004	0.0013
		AMB-10/31-03	Tom L.	1342 - 1701	398	0.005	0.0012
		AMB-10/31-FB1	Field Blank	NA	0 (a)	0.000	0
		AMB-10/31-FB2	Field Blank	NA	0 (a)	0.000	0
Nov. 1	Area	AMB-11/1-UP	Upwind	1115 - 1748	1,179	0.000	0.0004
		AMB-11/1-DN	Downwind	1010 - 1720	1,290	0.000	0.0004
	Personal	AMB-11/1-01	Bob M.	1515 - 1729	268	0.005	0.0018
		AMB-11/1-02	Ron P.	1520 - 1720	240	0.004	0.002
		AMB-11/1-02 (Dup.)	Ron P.	1520 - 1720	240	0.004	0.002
		AMB-11/1-03	Rick R.	1517 - 1725	256	0.004	0.0019
		AMB-11/1-FB1	Field Blank	NA	0 (a)	1.273 (a)	0
		AMB-11/1-FB2	Field Blank	NA	0 (a)	0.000	0
Nov. 2	Area	AMB-11/2-UP	Upwind	0820 - 1200	675	0.001	0.0007
		AMB-11/2-DN	Downwind	0820 - 1200	675	0.001	0.0007
	Personal	AMB-11/2-01	Personal	0815 - 1200	450	0.004	0.0011
		AMB-11/2-02	Personal	0815 - 1200	450	0.010	0.0011
		AMB-11/2-02 (Dup.)	Personal	0815 - 1200	450	0.011	0.0011
		AMB-11/2-FB1	Field Blank	NA	0 (a)	0.000	0
		AMB-11/2-FB2	Field Blank	NA	0 (a)	0.000	0

(a) Field blanks have no sample volume; results expressed as total fiber load (fibers/sq. mm)

Sampling Method: NIOSH 7400; Analytical Method: Phase Contrast Microscopy

ALLIANCE Technologies Corporation

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